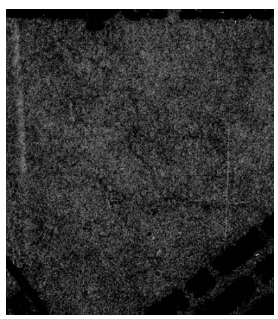
AD-A065 105 ROSENSTIEL SCHOOL OF MARINE AND ATMOSPHERIC SCIENCE --ETC F/G 8/10
THE ORIGINAL DATA AS OBSERVED BY R/V COLUMBUS ISELIN DURING THE--ETC(U)
NOV 78 O BROWN, W DUEING, R EVANS, Z HALLOCK N00014-75-C-0173

UNCLASSIFIED DR-78-1 NL

1 OF
AD
A065105

END
DATE
FILMED
4 -79
DDC



DISCLAIMER NOTICE

6

THE ORIGINAL DATA AS OBSERVED BY

R/V ISELIN

DURING THE

EQUATORIAL OCEANOGRAPHIC EXPERIMENT

GATE 1974,

COMPILED BY:

10

OTIS BROWN,

WALTER DÜING,

ROBERT EVANS

ZACHARIAH HALLOCK

14 DR-78-1

Rosenstiel School of Marine and Atmospheric Science/University of Miami

11 NOV[redacted]978

12 97p.

SUBMITTED TO: ~~The Office of Naval Research Contract~~
15 No. N 00014-75-C-0173, NSF-OCD73-00214

Approved for public release; distribution unlimited

and
The National Science Foundation - OCD73-00214A05

79 02 27 002

405515

16

ABSTRACT

28 deg W   23 deg 30 min W   24 deg W

METHOD:

During the second phase of GATE, a current profiling experiment was carried out by research vessels from four nations. The vessels operated at or near the equator in the vicinity of the following longitudes: R/V COLUMBUS ISELIN (U.S.A.) near 28°W; R/V ALEXANDER von HUMBOLDT (G.D.R.) near 24°W; R/V ACADEMICIAN KURCHATOV (U.S.S.R) near 23°30'W; and R/V CAPRICORNE (France) near 10°W. KURCHATOV worked at a fixed position; the other three vessels operated as roving ships (Fig. A). All vessels were equipped with profiling current meters (PCM's), provided by the University of Miami (see Düing and Johnson, 1972 for details on instrumentation). Current and temperature profiles were taken in the vicinity of anchored radar reference buoys shown in Fig. A. Profiling operations were routinely carried out to a water depth of 600 meters, lasting about 2-1/2 hours per profile. During the observation of a relative current profile, radar distance and azimuth to a reference buoy were observed at 10 minute intervals. A mean drift vector over ground was computed and subsequently used to transform the relative current profile into an absolute profile. The relative error of the measurements made by the ISELIN is approximately ± 8% of the values of the flow components. The following conditions must be met to obtain accurate absolure PCM profiles:

10 deg W

ABSTRACT

a) small wire angle (< 15°)

b) descent rate <15cm/sec

c) uniform ship drift (absolute accuracy is dependent on both PCM and drift measurements)

+ or −

d) water velocity > 5 cm/sec

Figure B shows examples of ship drift vectors. An error of ± 8% would be valid for case (a); it would be considerably larger for case (b). All other ship drift vectors are given in Table 1. Evans and Leaman (1978) compared simultaneous observations made by the PCM method and the White Horse Acoustic Profiler. They find very good agreement, provided the inherent limitations of both methods are taken into account.

In this report, only data from R/V ISELIN are presented. Detailed results of the observations by vonHUMBOLDT, KURCHATOV and CAPRICORNE were presented by Brown and Voigt (1975), Hallock and Moroshkin (1975) and Düing, Hisard and Low (1975).

The ISELIN completed eight round trips along the westernmost trapezoid, cycling reference buoys in the following sequence: P10, P9, P8, P7, P6, M3, M2, M1 (Fig. C). The repetition rate varied between 52 and 97 hours (see Table 1). STD-data were taken by standard methods (Bissett-Berman STD 9040). XBT-data were taken at several sections and are also presented.

REFERENCES

Brown, O. B. and K. Voigt (1975): Preliminary scientific results (Volume I) of the GARP Atlantic Tropical Experiment. GATE Report No. 14, World Meteorological Organization, Geneva, 363 pp.

Düing, W. and D. Johnson (1972): High resolution current profiling in the Straits of Florida, Deep-Sea Res., 19, 259-274.

Düing, W., Ph. Hisard and J. Low (1975): Current profiling observations by the R/V CAPRICORNE. Preliminary Scientific Results (Volume I) GARP Atlantic Tropical Experiment, GATE Report No. 14, World Meteorological Organization, Geneva, 364 pp.

Evans, R. and K. Leaman (1978): A comparison between the Düing Profiling Current Meter and the White Horse Acoustic Profiler (accepted for publication J. Geophys. Res., 13 pp).

Hallock, Z.R. and K.V. Moroshkin (1975): Fluctuations in the vertical structure of the Atlantic Equatorial Undercurrent, Preliminary Scientific Results (Volume II). GARP Atlantic Tropical Experiment, GATE Report No. 14, World Meteorological Organization, Geneva, 397 pp.

Acknowledgements

This research was supported by the Office of Climate Dynamics of the National Science Foundation, grant number ATM 77-22902 and by the Office of Naval Research, contract number N 00014-75-C-0173.

LIST OF FIGURES

DRIFT VECTORS

STATION NO.	POSITION		DATE	TIME + 2 = GMT		SHIP DRIFT	
	LAT.	LONG.		START	STOP	U	V
ISL001	01° 37'.4 N	28° 00.4 W	07/26/74	1227			
ISL002	00° 34'.5 N	27° 58'.1 W	"	2336			
ISL003	00° 06'.5 S	28° 02'.0 W	07/27/74	1154			
ISL004	00° 42'.5 S	27° 57'.0 W	"	1845			
ISL005	00° 28'.8 S	27° 56'.0 W	07/28/74	0508			
ISL006	00° 49'.0 S	29° 05'.7 W	"	2033			
ISL007	00° 25'.9 N	29° 04'.9 W	07/29/74	1359			
ISL008A	00° 37'.5 N	28° 00'.0 W	07/30/74	1300	1430	16.6	7.2
ISL009	00° 39'.4 N	27° 59'.6 W	"	2045			
ISL010	00° 06'.5 S	28° 02'.8 W	07/31/74	0550	0750	19.8	16.0
ISL011	00° 42'.6 S	27° 57'.2 W	"	1435	1600	35.7	4.7
ISL012	01° 19'.0 S	28° 01'.0 W	08/01/74	0030	0200	20.6	4.3
ISL013	00° 49'.0 S	29° 05'.7 W	"	0930	1130	36.5	19.3
ISL014	00° 25'.2 N	29° 04'.0 W	"	1815	1925	35.4	13.8
ISL015	01° 38'.0 N	28° 00'.4 W	08/02/74	0555	0800	46.7	25.0
ISL016	00° 39'.5 N	27° 58'.0 W	"	1700	1800	36.1	10.0
ISL016A	"	"	"	1810	1910	68.4	17.2
ISL017	00° 06'.5 S	28° 00'.3 W	08/03/74	0130	0330	26.4	17.9
ISL018	00° 42'.5 S	27° 57'.0 W	"	0750	0920	46.6	29.6
ISL020	00° 19'.0 S	29° 06'.0 W	"	1804	1952	28.5	6.0
ISL021	00° 25'.0 N	29° 04'.0 W	08/04/74	0305	0450	44.9	21.6
ISL022	01° 37'.5 N	28° 00'.5 W	"	1330	1530	53.6	-14.9
ISL023	00° 39'.5 N	27° 54'.0 W	08/05/74	1110	1320	40.8	-17.6
ISL024	00° 06'.5 S	28° 03'.0 W	"	2030	2220	53.7	11.7
ISL025	00° 42'.5 S	27° 57'.0 W	08/06/74	0330	0530	39.8	-8.1
ISL026	01° 19'.0 S	28° 01'.0 W	"	0945	1229	17.1	-0.1
ISL026A	"	"	"	1557	1630	35.9	-1.7
ISL027	00° 39'.5 N	27° 54'.0 W	08/07/74	0440	0620	60.3	-19.8
ISL028	00° 06'.0 S	28° 03'.0 W	"	1310	1440	51.2	22.7
ISL029	00° 42'.0 S	27° 57'.0 W	"	1950	2130	43.8	6.7
ISL030	01° 19'.0 S	28° 01'.0 W	08/08/74	0150	0330	43.1	10.8
ISL031	00° 49'.0 S	29° 06'.0 W	"	1050	1250	34.5	4.4
ISL032	00° 00'.0	28° 52'.0 W	"	1755	1930	50.2	-23.8
ISL033	00° 25'.0 N	29° 04'.0 W	"	2300	0010	48.2	13.8
ISL034	01° 37'.0 N	28° 00.0 W	08/09/74	0945	1100	48.8	10.2
ISL035	00° 39'.0 N	27° 54'.0 W	"	1745	1930	36.5	-8.5
ISL036	00° 06'.5 S	28° 03'.0 W	08/10/74	0020	0230	39.3	1.8
ISL036A	00° 06'.5 S	28° 03'.0 W	08/10/74	0240	0400	41.7	2.9
ISL037	00° 42'.0 S	27° 57'.0 W	"	0920	1120	32.5	-16.7
ISL038	01° 19'.0 S	28° 01'.0 W	"	1520	1700	36.7	11.5
ISL039	01° 46'.0 S	28° 02'.0 W	"	1932			
ISL040	00° 49'.0 S	29° 06'.9 W	08/11/74	0640	0810	47.7	8.9
ISL041	00° 25.0 N	29° 04'.0 W	"	1650	1840	28.9	14.0
ISL042	01° 37'.5 N	28° 00'.5 W	08/12/74	0455	0630	35.4	30.2
ISL043	00° 39'.0 N	27° 54'.0 W	"	1250	1430	62.3	11.3
ISL044	00° 06'.5 S	28° 03'.0 W	"	1955	2130	53.3	17.9
ISL045	00° 42'.5 S	27° 57'.0 W	08/13/74	0135	0310	52.1	22.6
ISL046	01° 19'.0 S	28° 01'.0 W	"	0740	0940	42.9	24.6
ISL047	01° 39'.0 S	28° 03'.0 W	"	1245			
ISL048	01° 46'.0 S	28° 02'.5 W	"	1606			
ISL049	00° 49'.0 S	29° 06'.0 W	08/14/74	0115	0250	50.3	-15.9
ISL050	00° 01'.0 S	28° 52'.0 W	"	0740	0952	43.7	16.1
ISL051	00° 25'.0 N	29° 04'.0 W	"	1530	1710	57.7	-1.9
ISL052	01° 37'.5 N	28° 00'.5 W	08/15/74	0310	0500	18.1	3.2
ISL053	00° 39'.5 N	27° 54'.0 W	"	1250	1450	39.7	-14.0
ISL054	00° 06'.5 S	28° 03.0 W	08/16/74	0210	0350	47.8	-6.3
ISL055	00° 42'.5 S	27° 57'.0 W	"	0810	0950	45.1	-10.7
ISL056	01° 19'.0 S	28° 01'.0 W	"	1350	1510	50.9	-2.9
ISL058	00° 06'.5 S	28° 03'.0 W	08/17/74	1100	1230	60.4	11.1
ISL059	00° 42'.5 S	27° 57'.0 W	"	1850	2020	51.2	7.2

Table 1- Ship drift vectors ovserved on radar from R/V ISELIN referring to anchored buoys

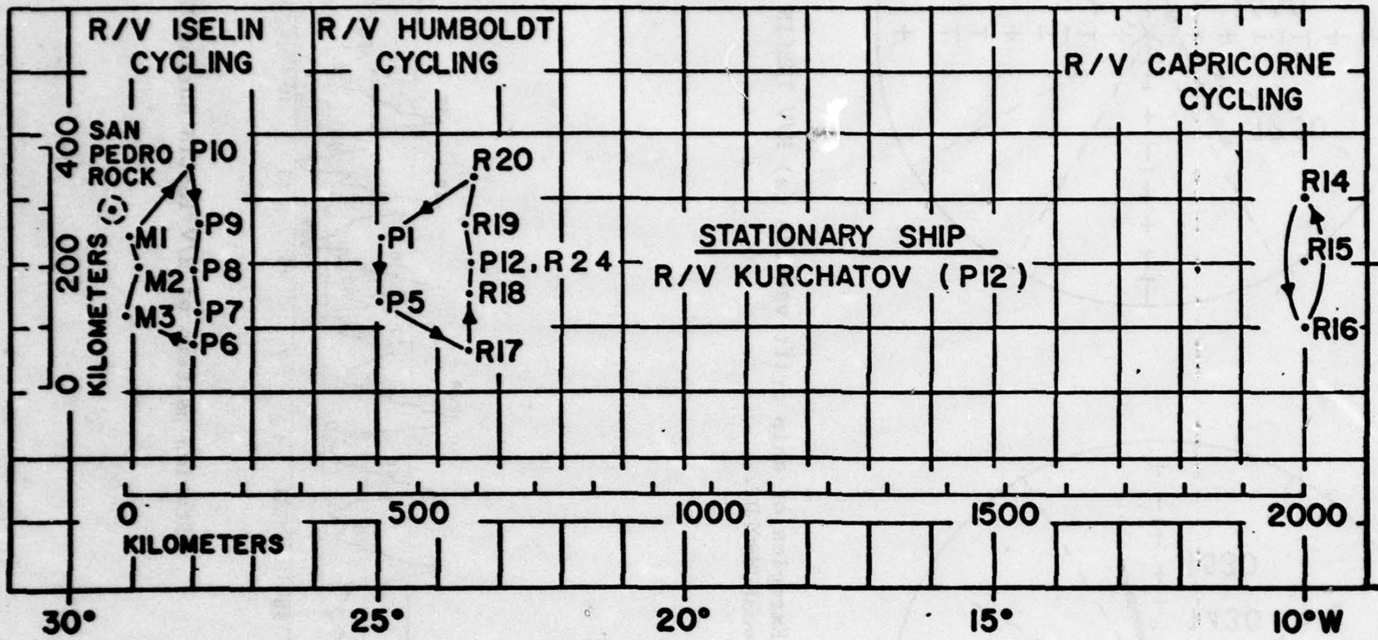


Figure A: Patterns of reference buoys used during Phase II of GATE.

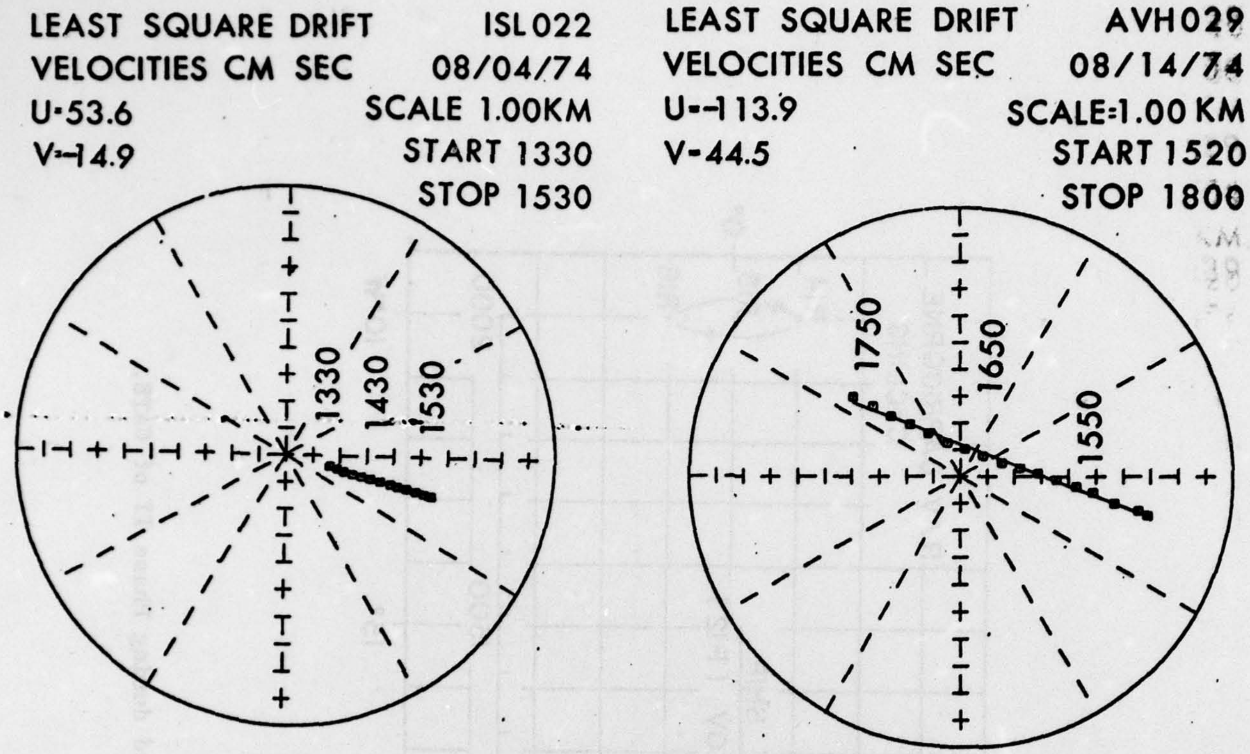


Figure B: Examples of ship drift vectors (a) R/V ISELIN (b) ALEXANDER vonHUMBOLDT.

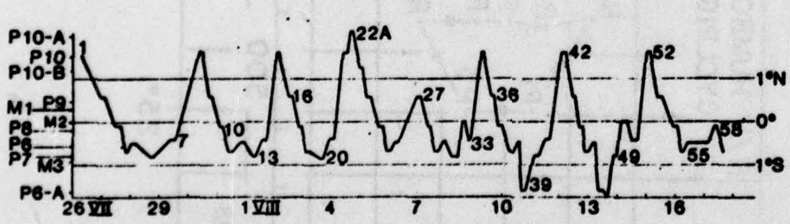


Figure C: Station pattern of R/V ISELIN during GATE, Phase II.

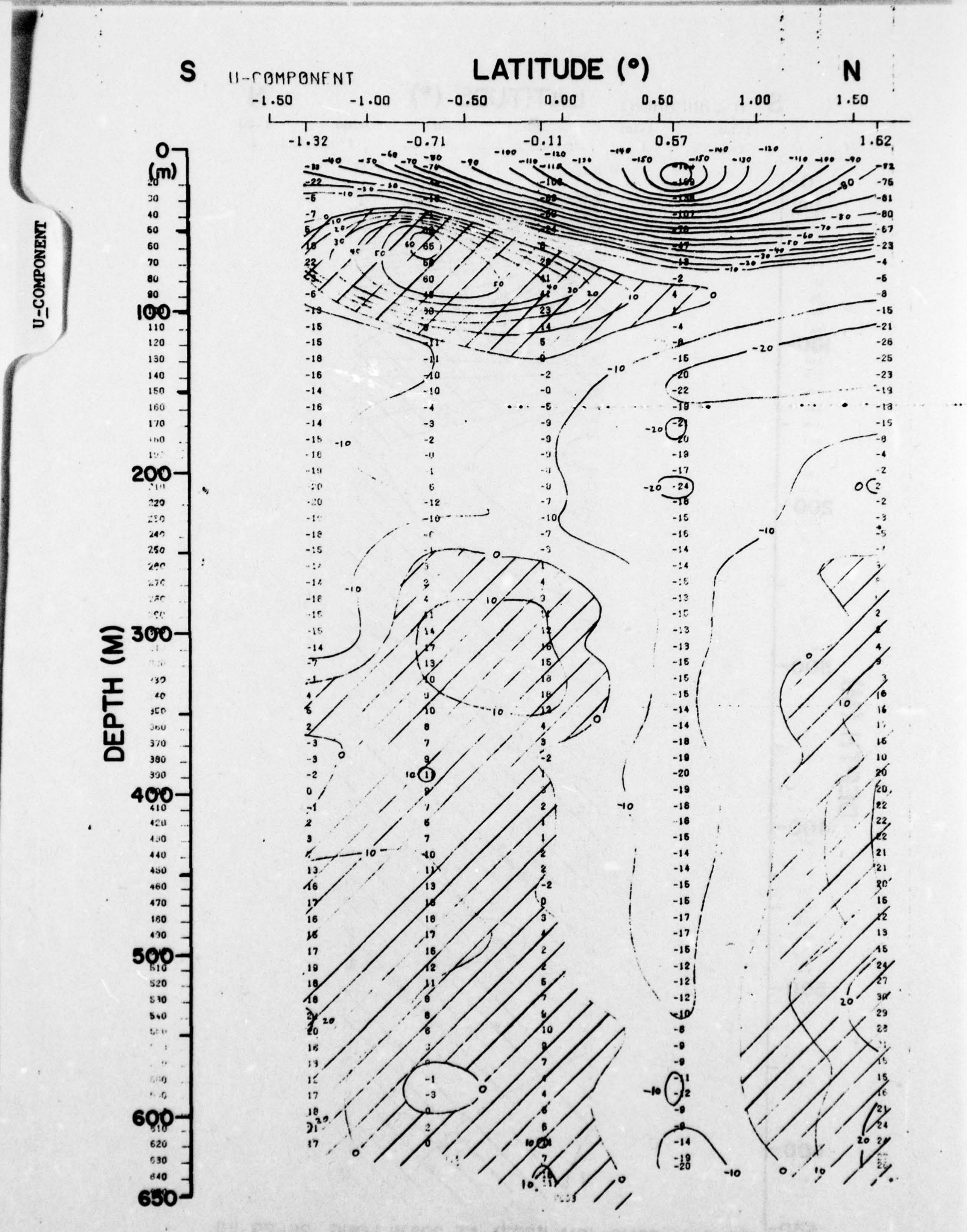


FIG. I U-COMP. (CM·SEC⁻¹) AT 28° W. LONG. 26-28 JUL.

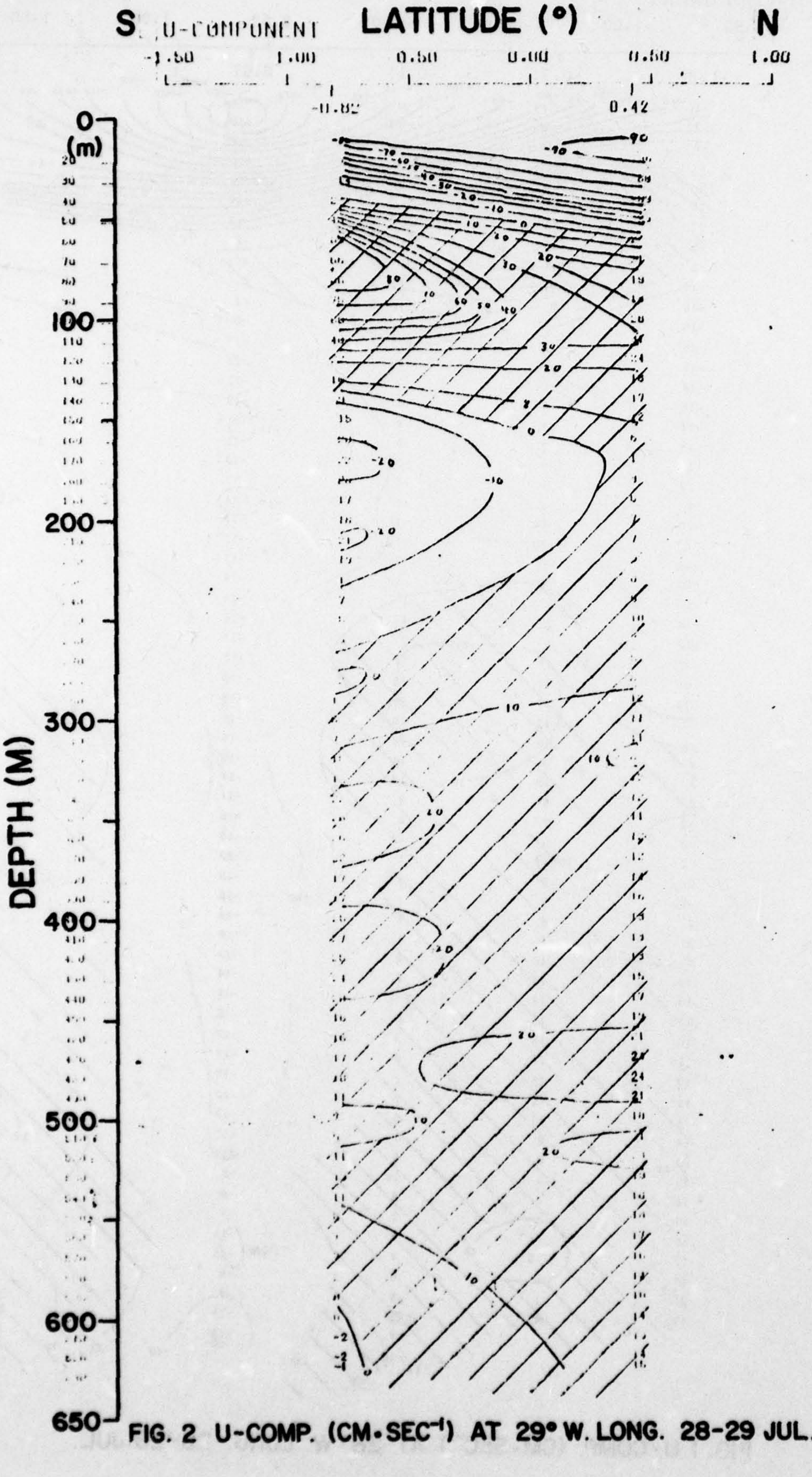


FIG. 2 U-COMP. (CM•SEC^{-1}) AT 29° W. LONG. 28-29 JUL.

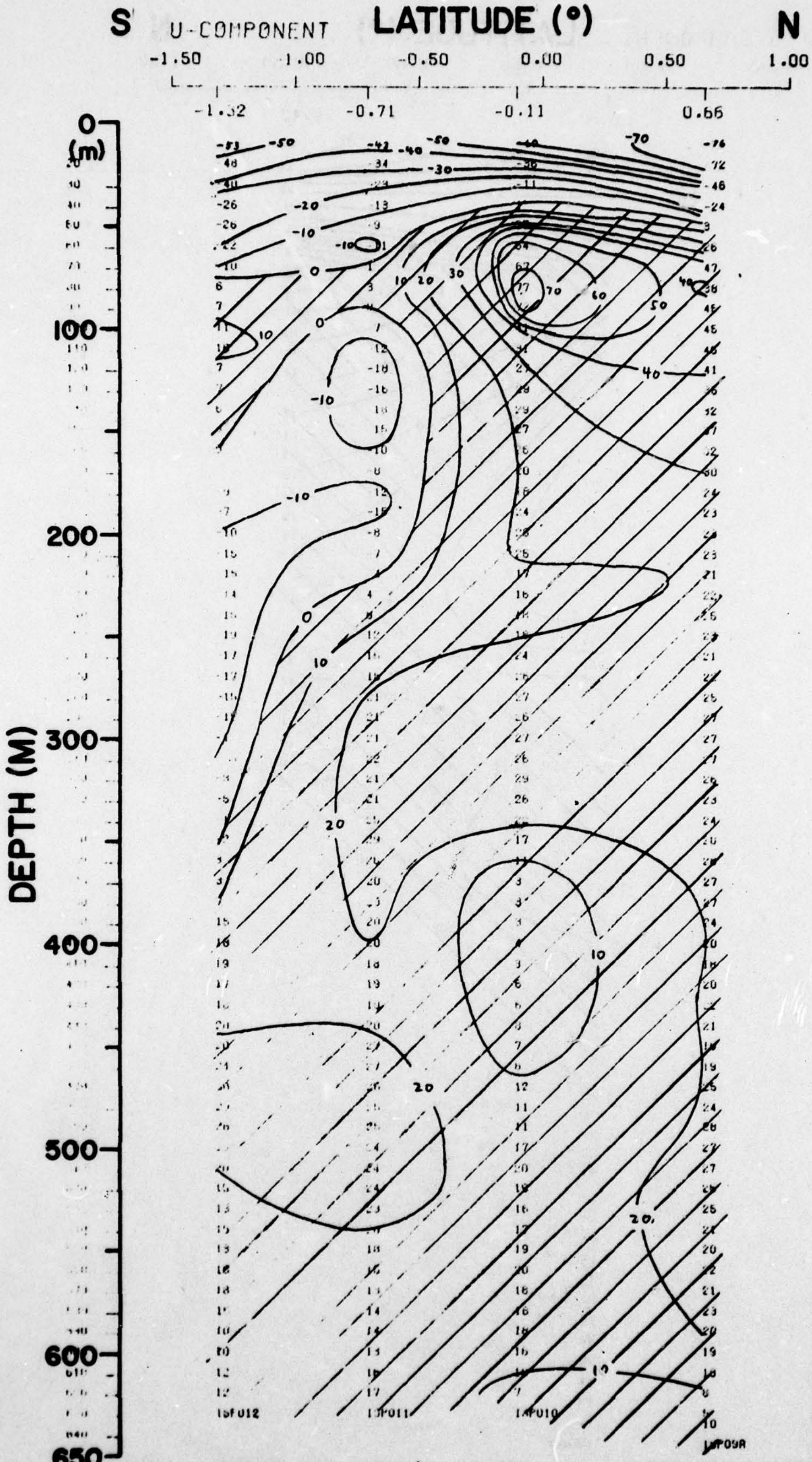


FIG. 3 U-COMP. (CM·SEC^{-1}) AT 28° W. LONG. 30 JUL.–1 AUG.

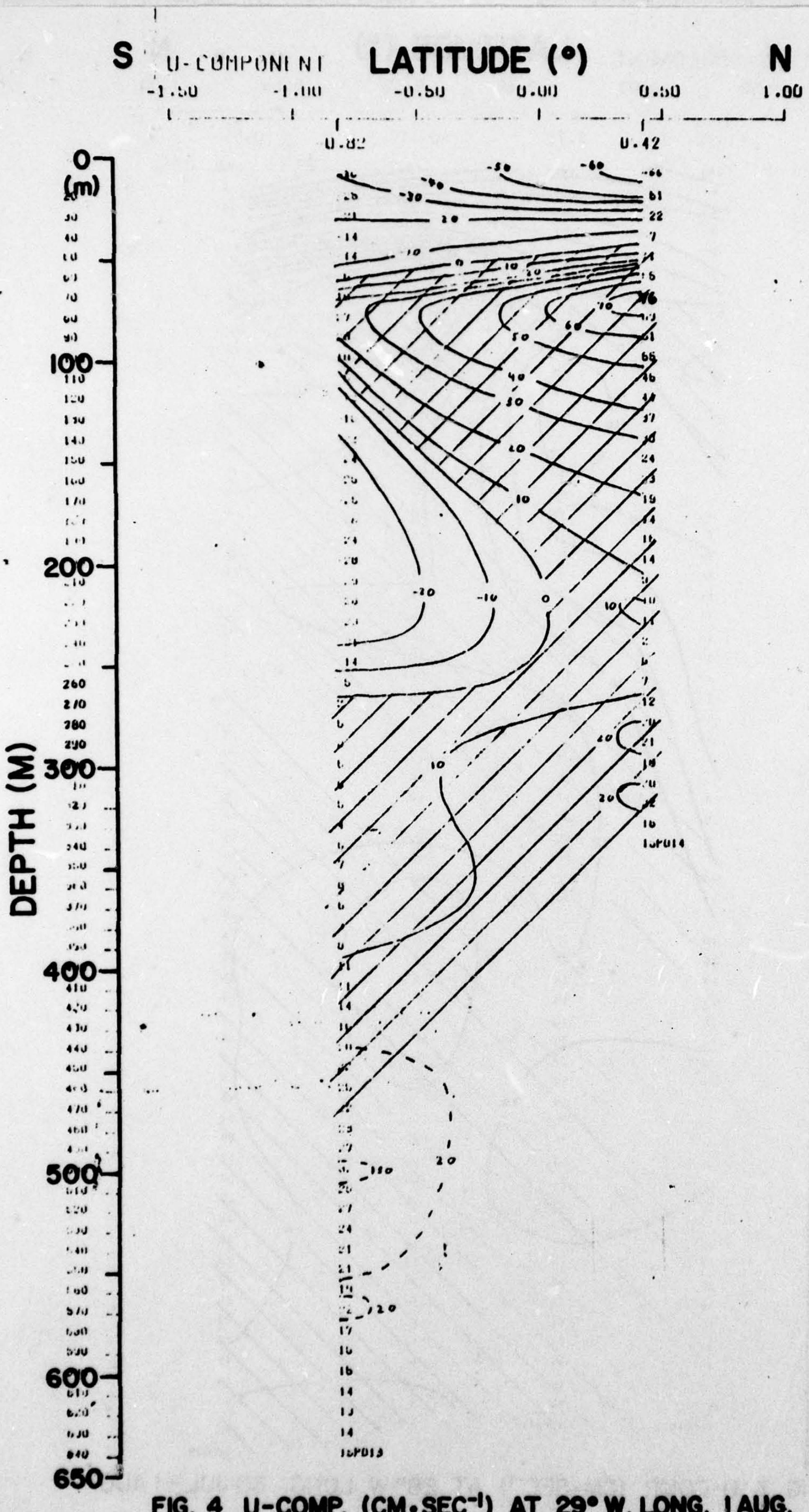


FIG. 4 U-COMP. (CM•SEC⁻¹) AT 29° W. LONG. 1 AUG.

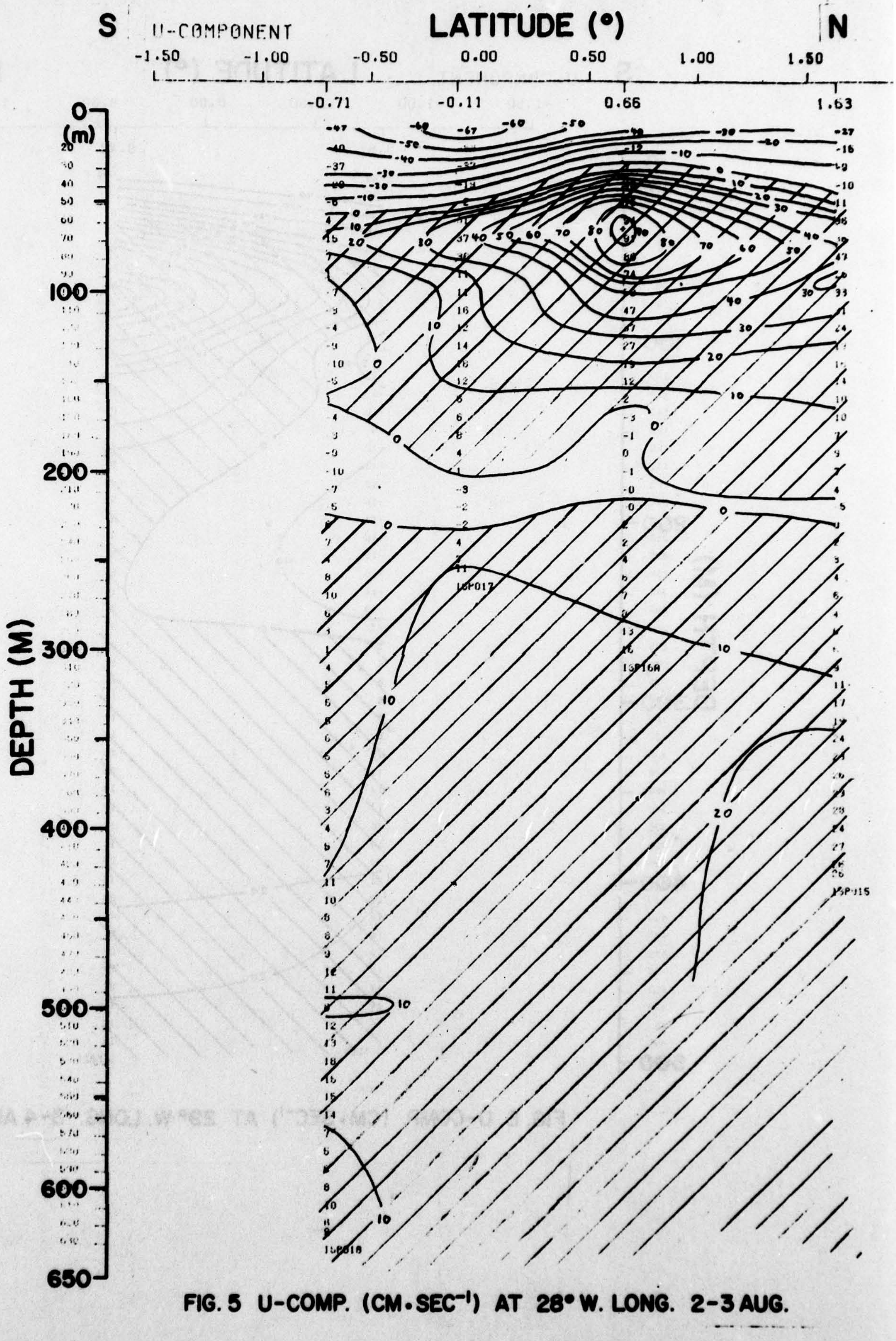


FIG. 5 U-COMP. (CM·SEC⁻¹) AT 28° W. LONG. 2-3 AUG.

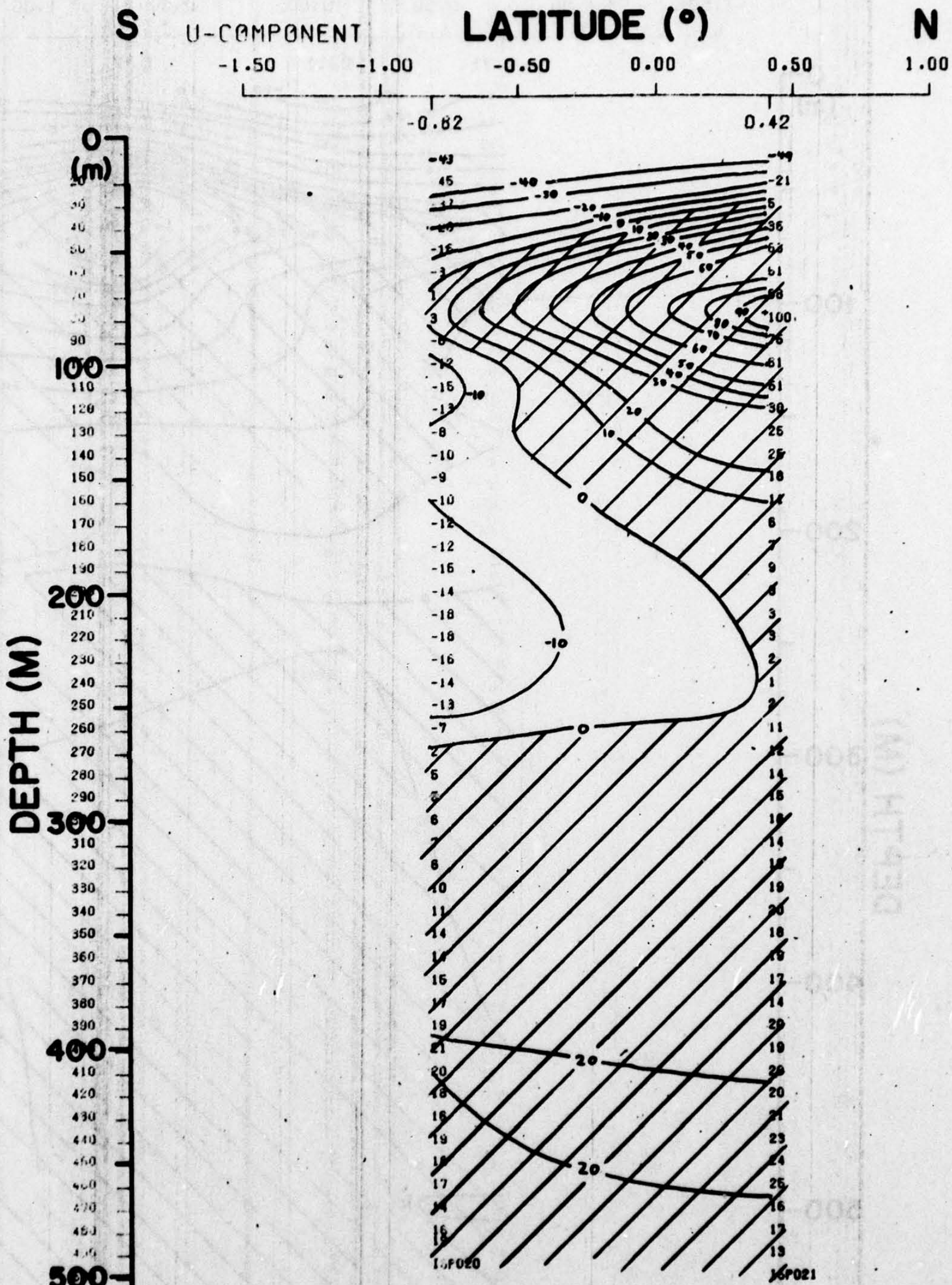


FIG. 6 U-COMP. (CM·SEC^{-1}) AT 29° W. LONG. 3-4 AUG.

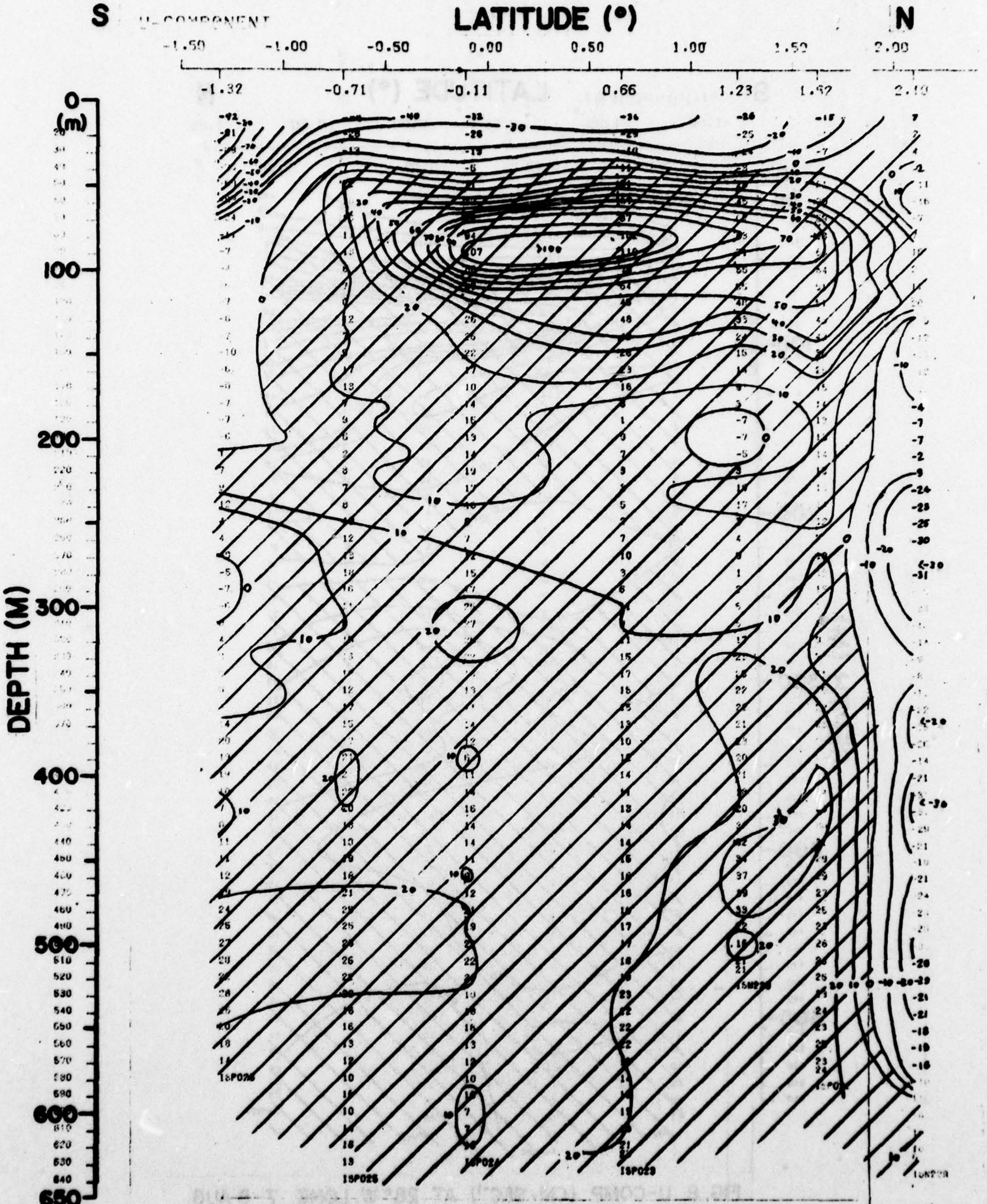


FIG. 7 U-COMP. (CM SEC⁻¹) AT 28° W. LONG. 4-6 AUG.

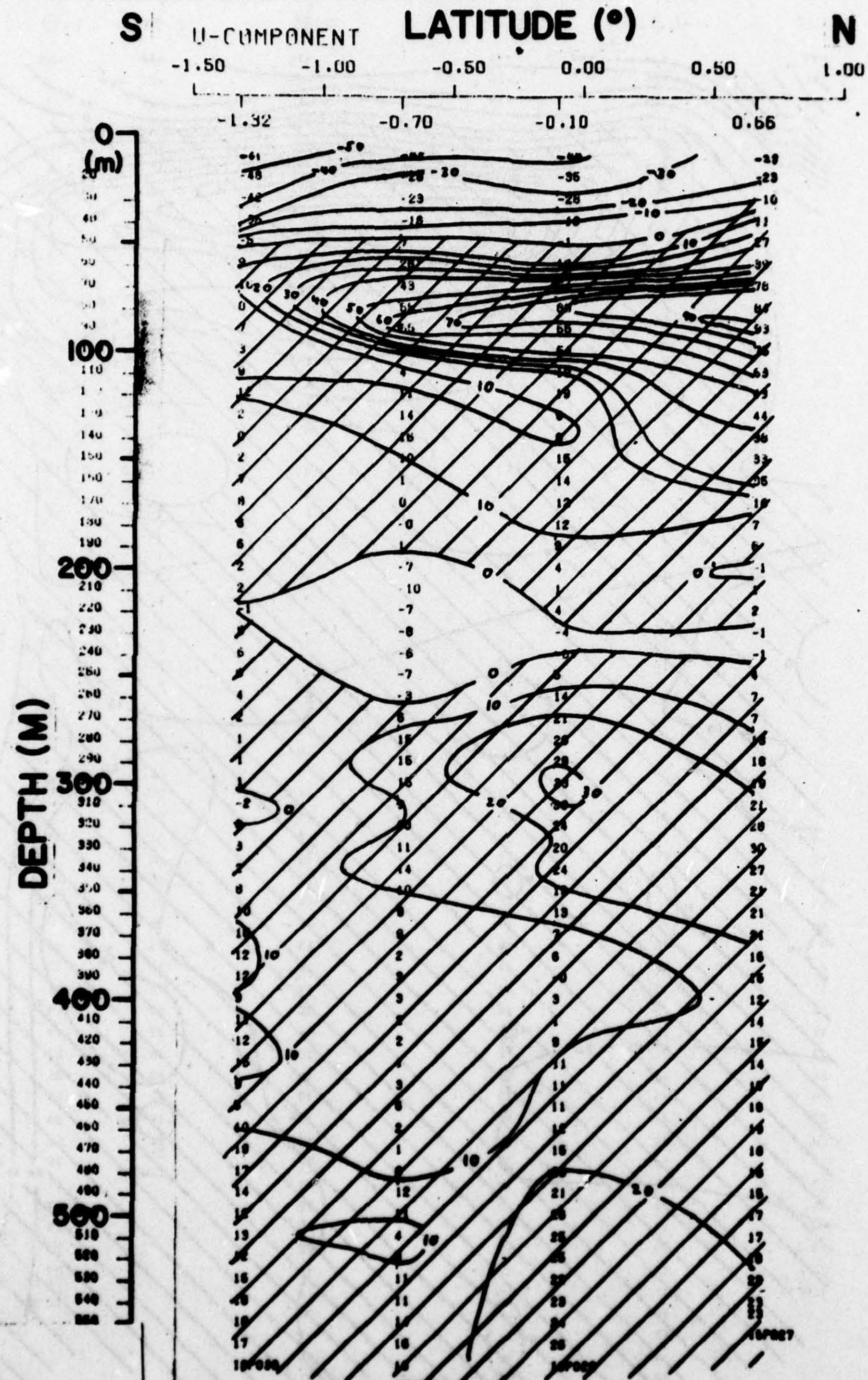


FIG. 8 U-COMP. (CM·SEC⁻¹) AT 28° W. LONG. 7-8 AUG.

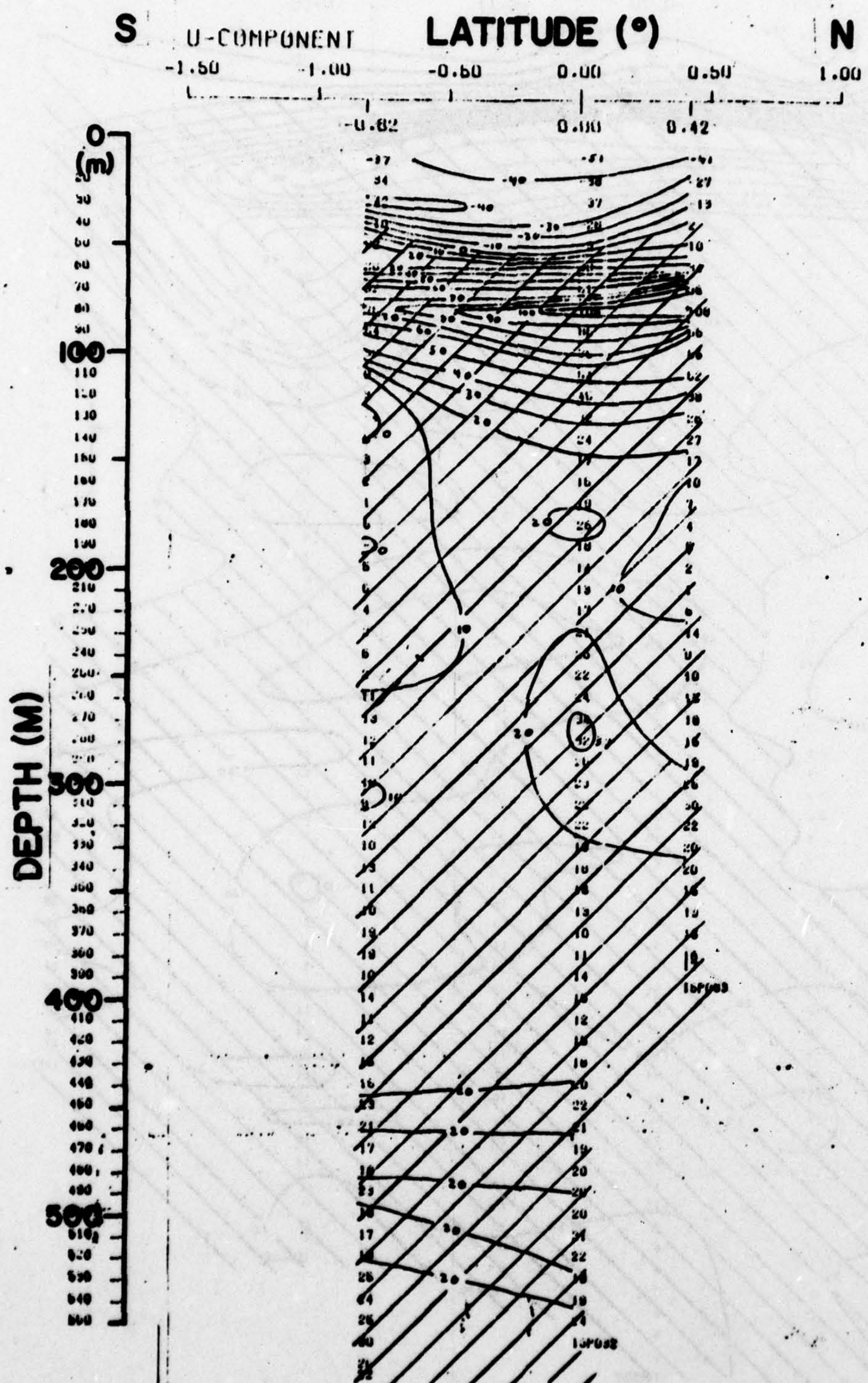


FIG. 9 U-COMP. (CM·SEC⁻¹) AT 29° W. LONG. 8 AUG.

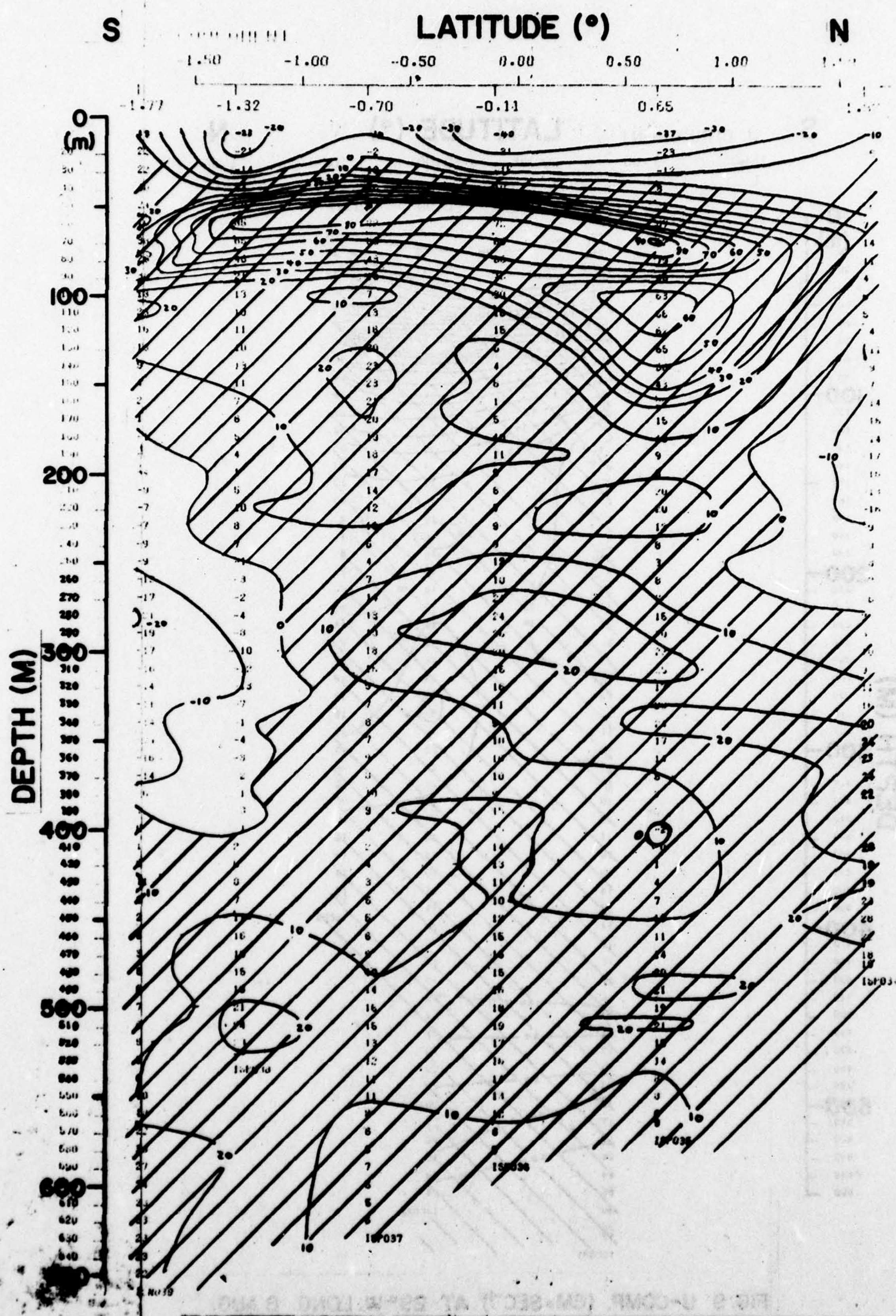


FIG. 10 U-COMP. (CM·SEC⁻¹) AT 28° W. LONG. 9-10 AUG.

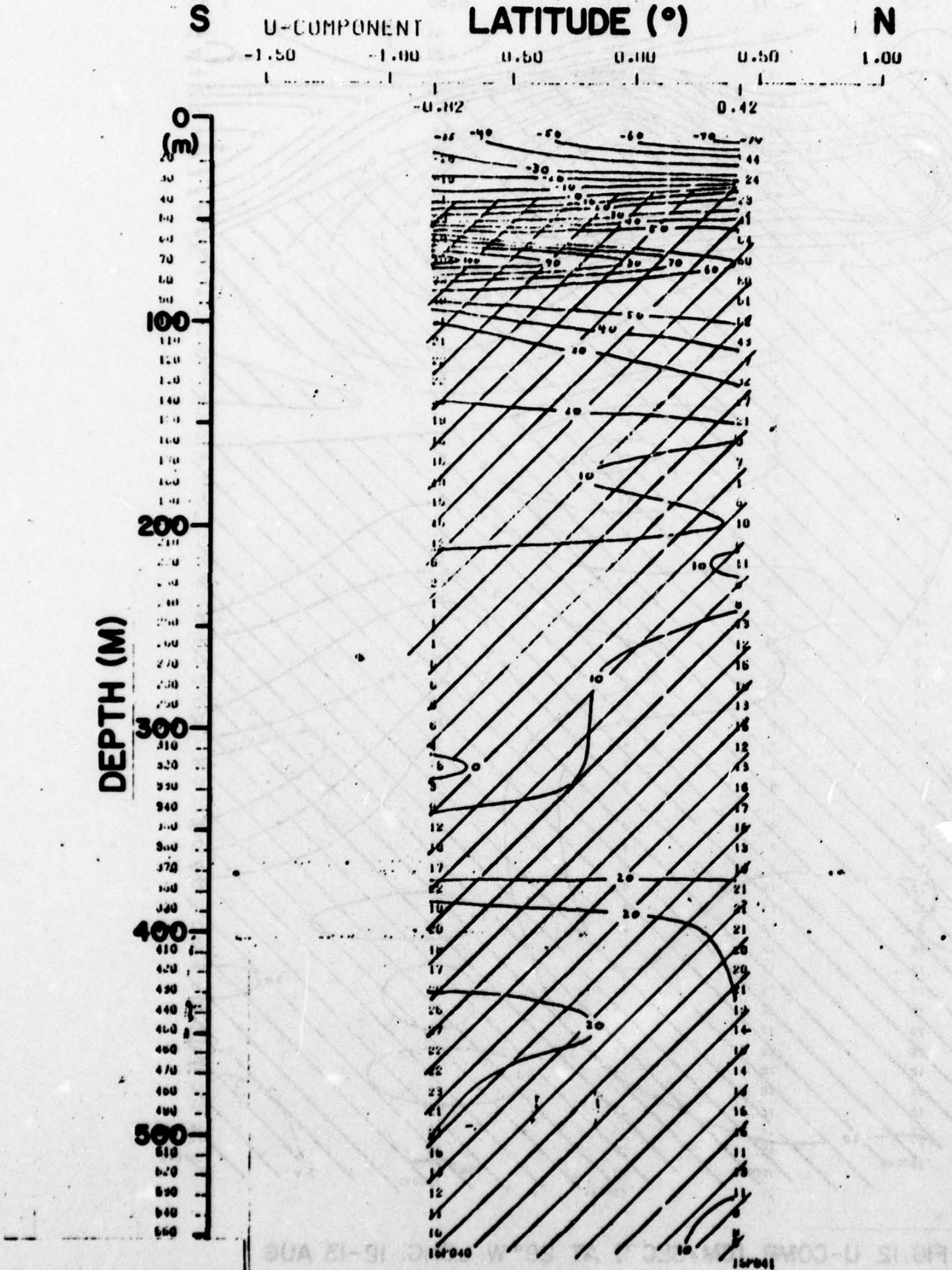


FIG. 11 U-COMP. (CM·SEC⁻¹) AT 29° W. LONG. 11 AUG.

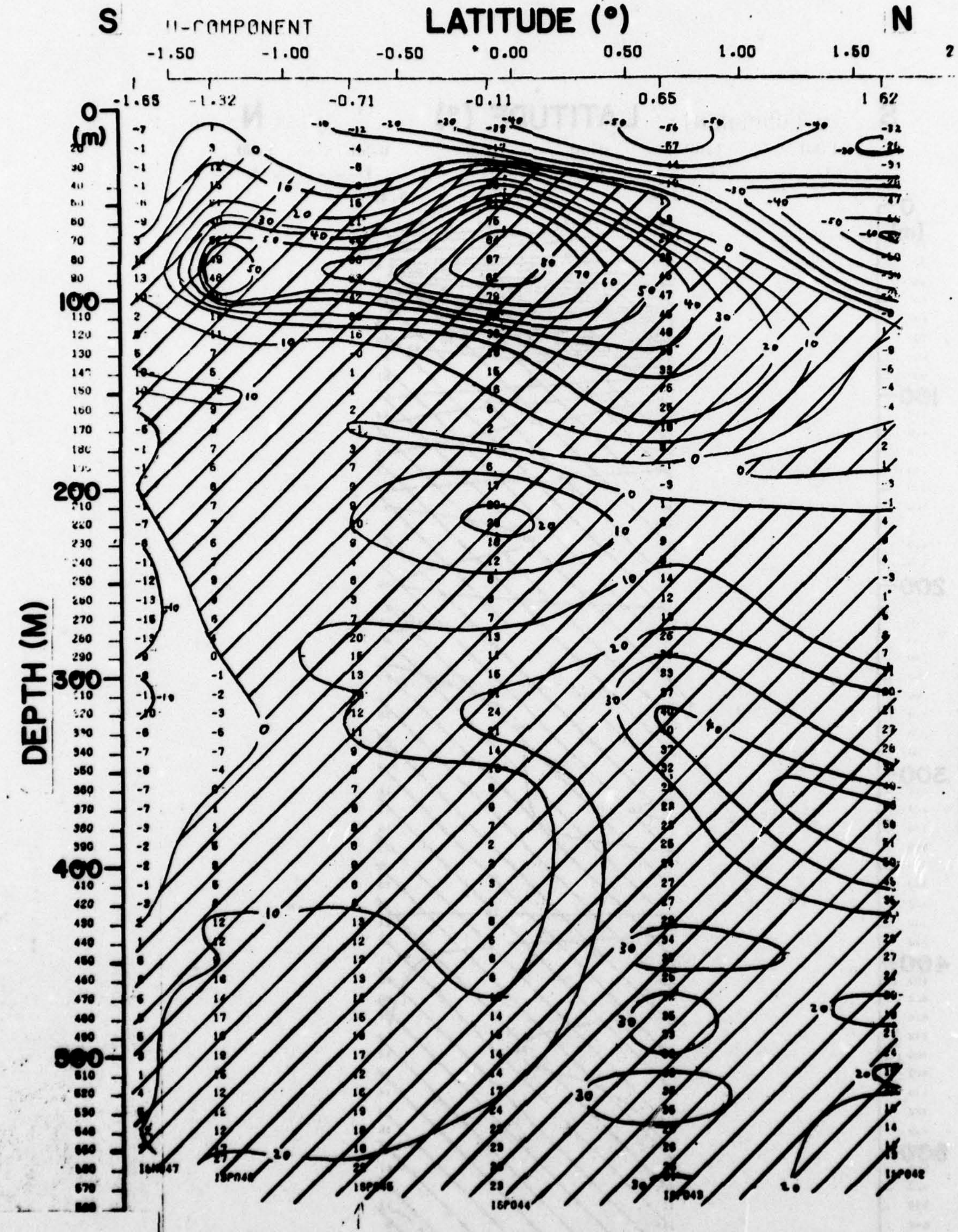


FIG. 12 U-COMP. (CM·SEC⁻¹) AT 28° W. LONG. 12-13 AUG.

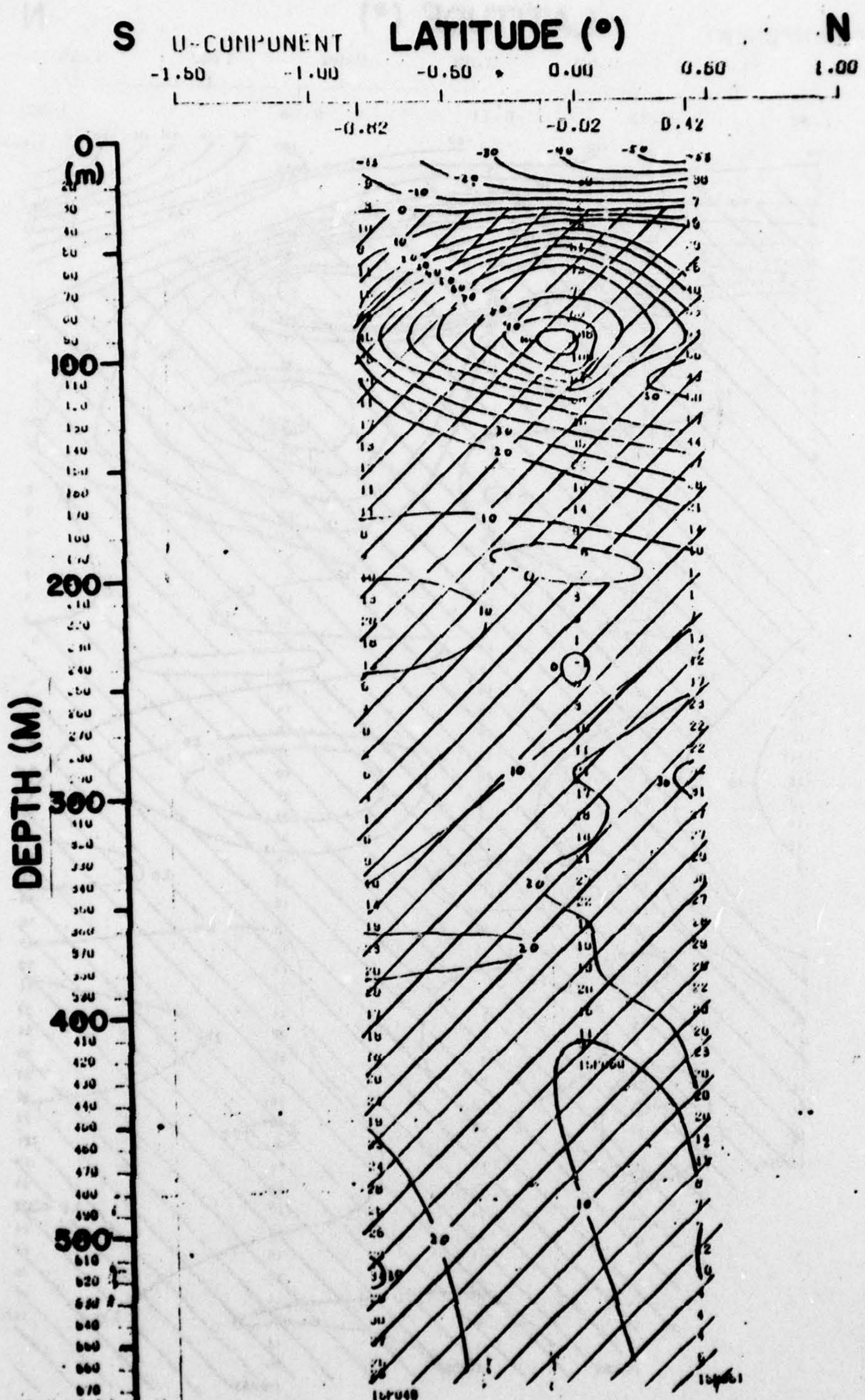


FIG. 13 U-COMP. (CM·SEC^{-1}) AT 29° W. LONG. 14 AUG.

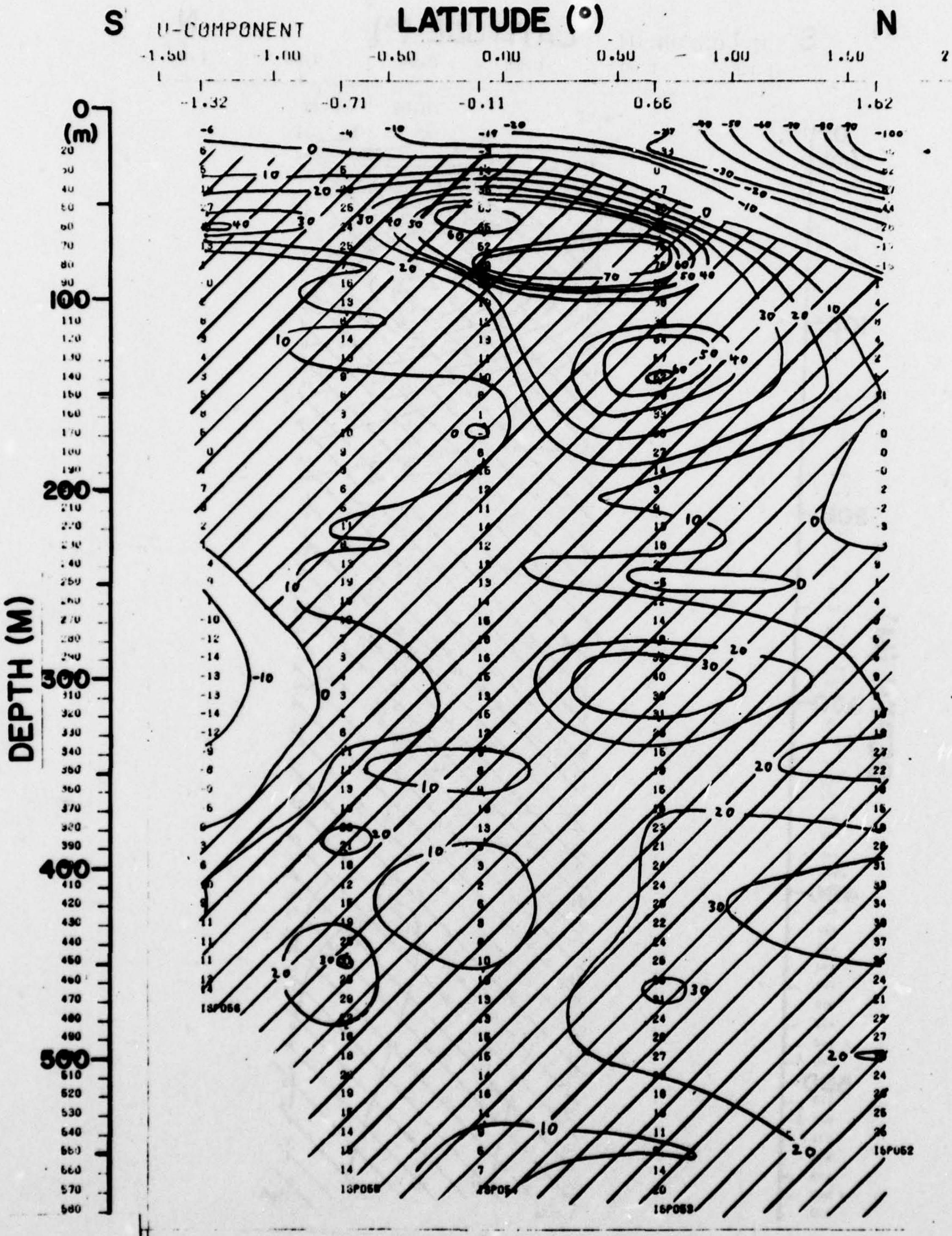


FIG. 14 U-COMP. (CM·SEC⁻¹) AT 28° W. LONG. 15-16 AUG.

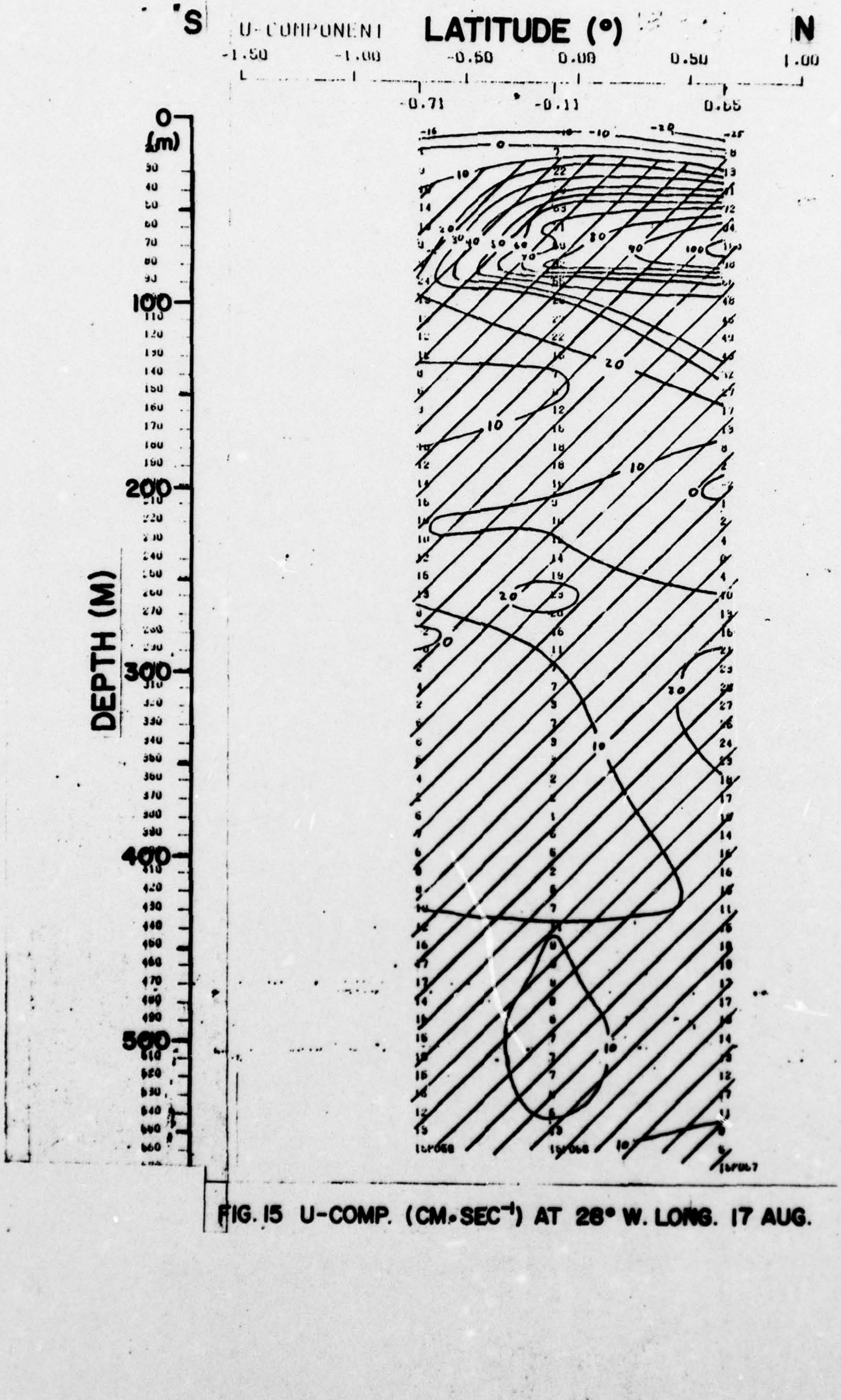


FIG. 15 U-COMP. (CM·SEC^{-1}) AT 28° W. LONG. 17 AUG.

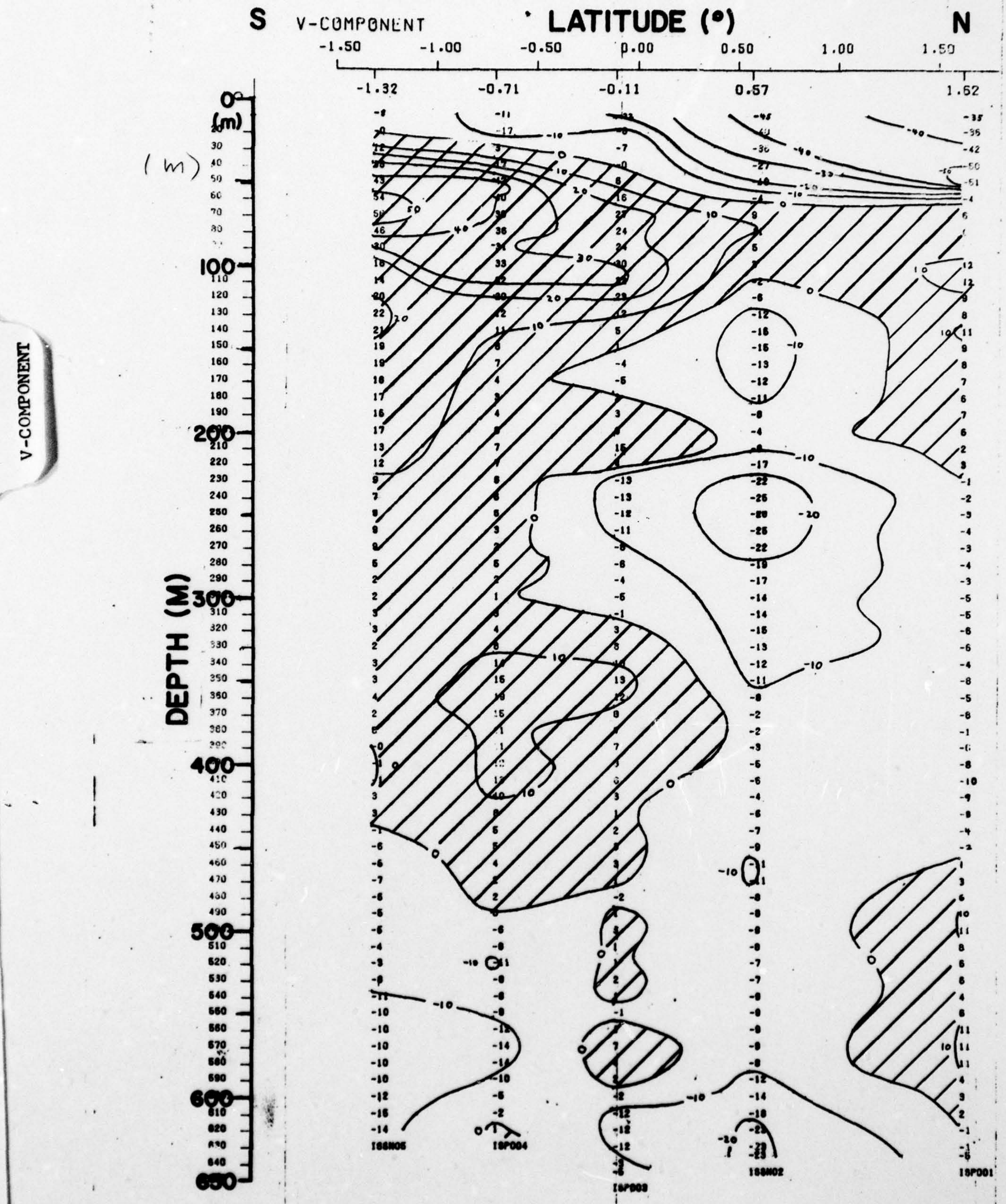


FIG. 16 V-COMP. (CM·SEC⁻¹) AT 28° W. LONG. 26-28 JUL.

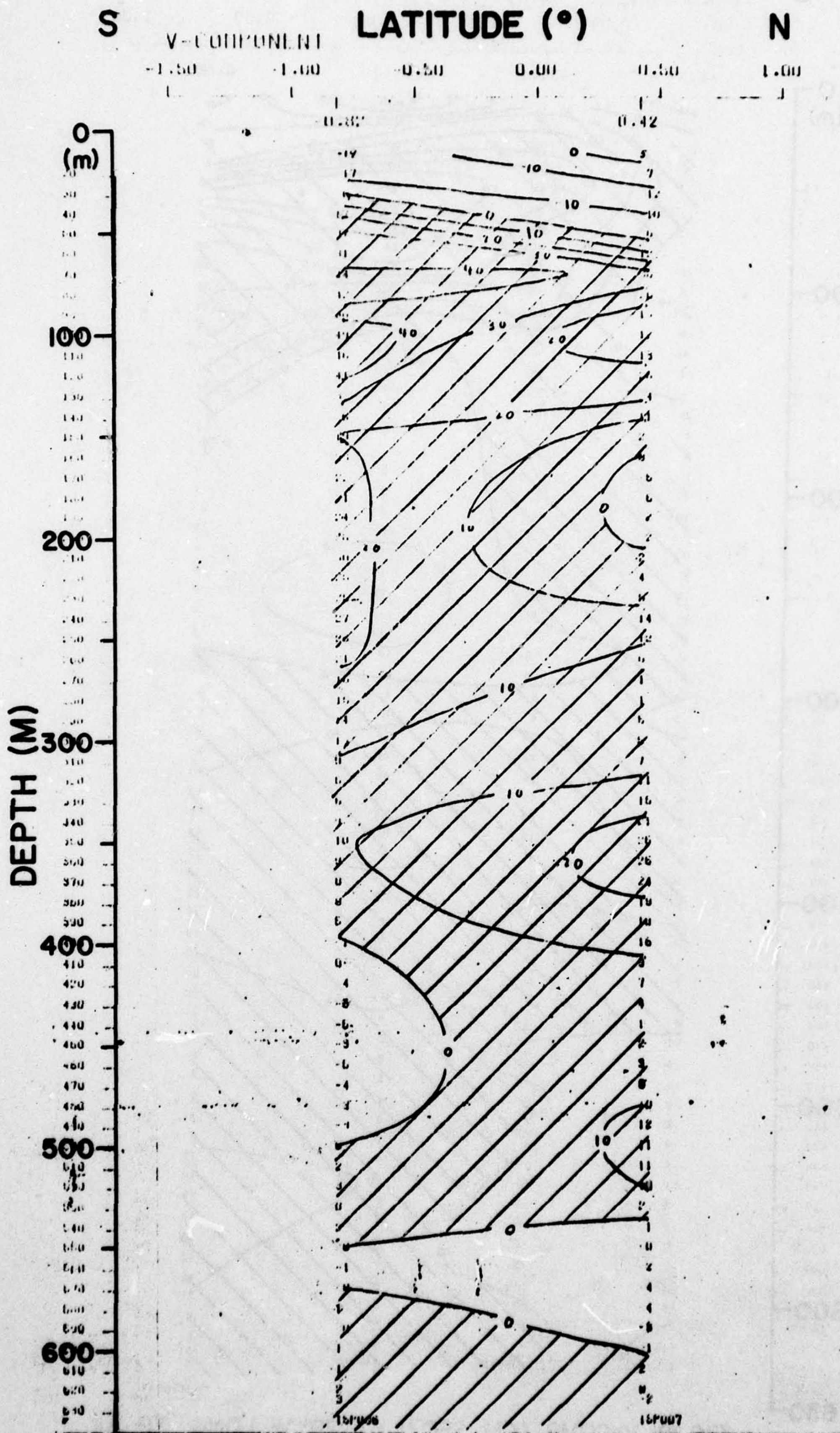


FIG. 17 V-COMP. (CM·SEC^{-1}) AT 29° W. LONG. 28-29 JUL.

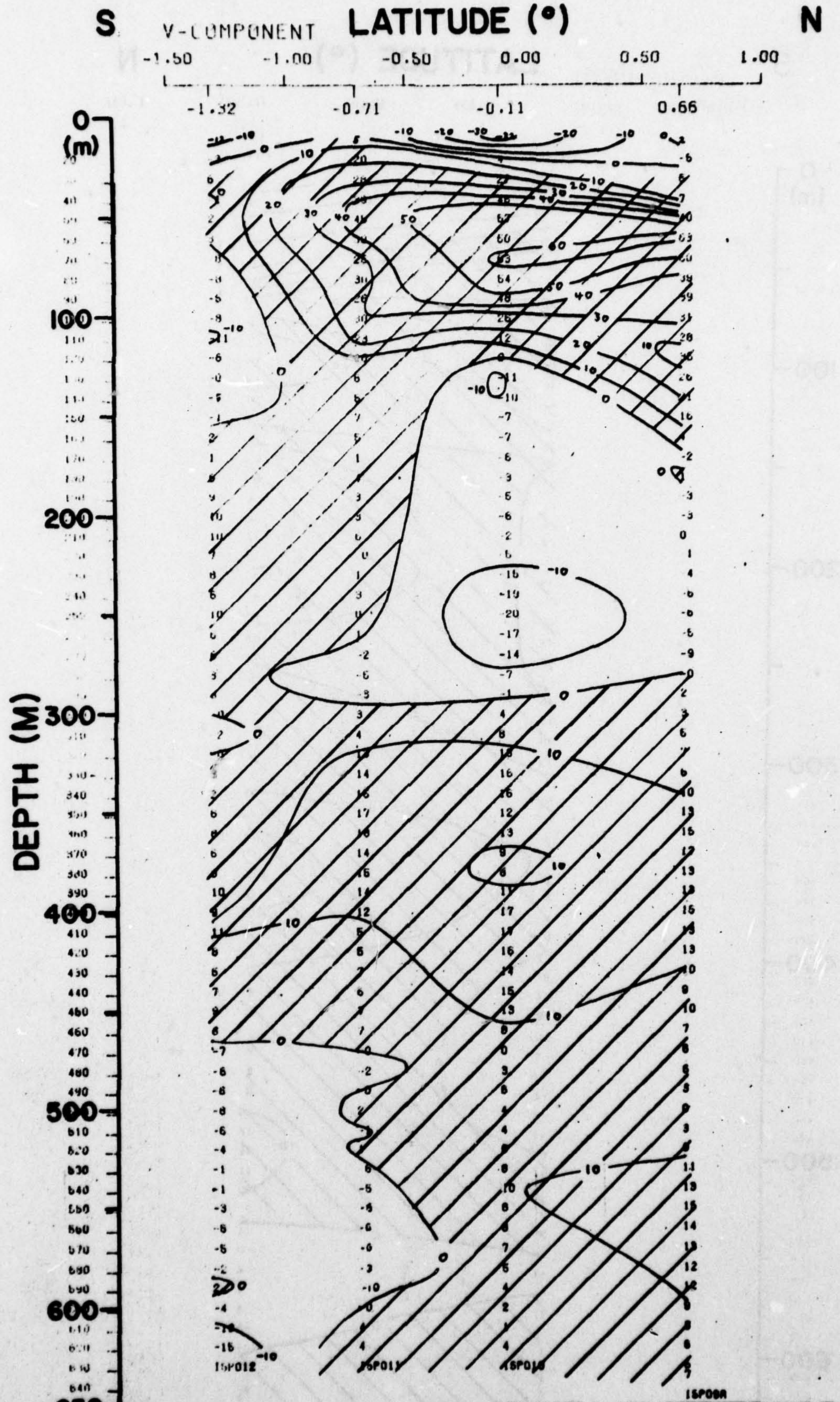


FIG. 18 V-COMP. (CM·SEC^{-1}) AT 28° W. LONG. 30 JUL.

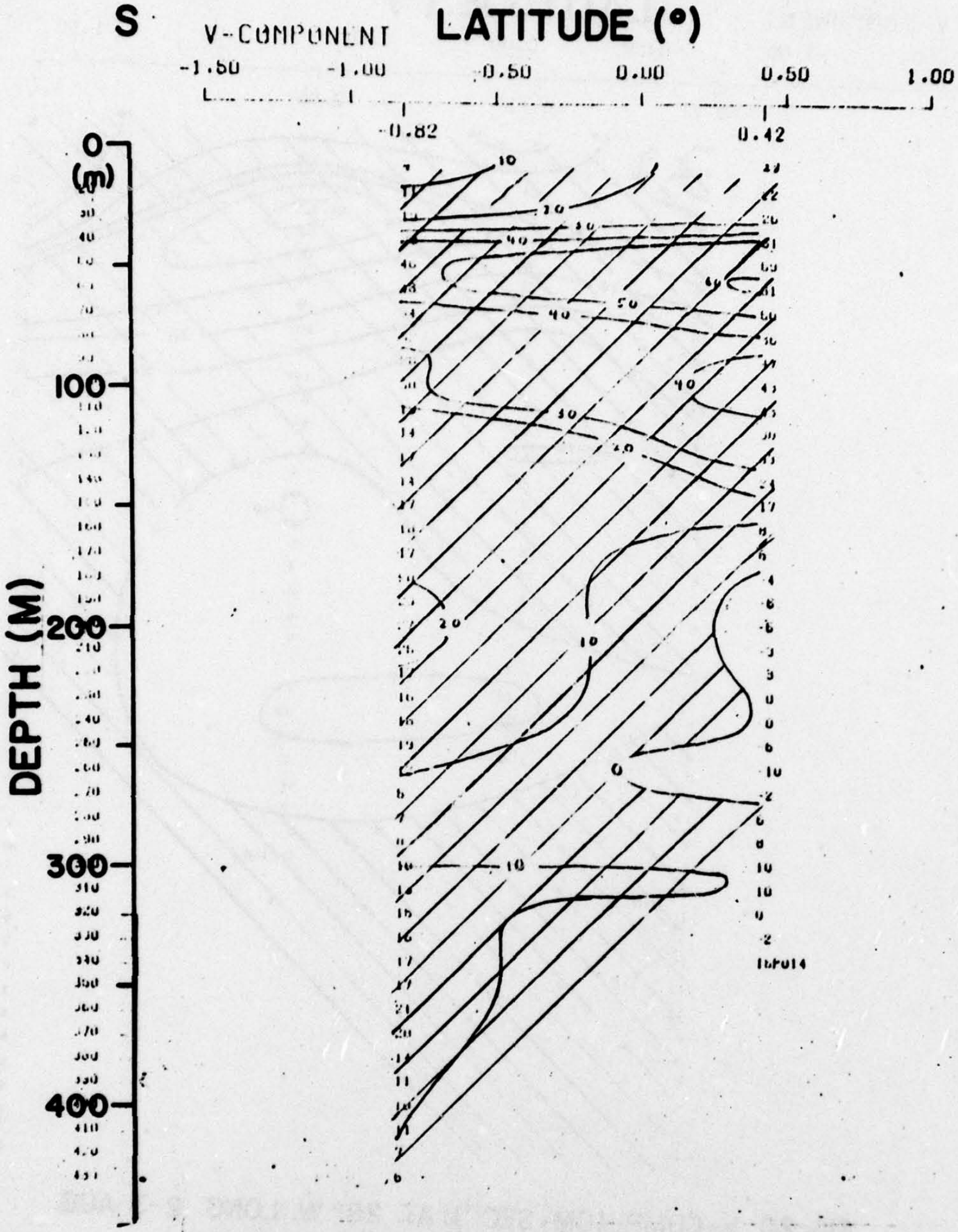


FIG. 19 V-COMP. (CM.SEC^{-1}) AT 29° W. LONG. 1 AUG.

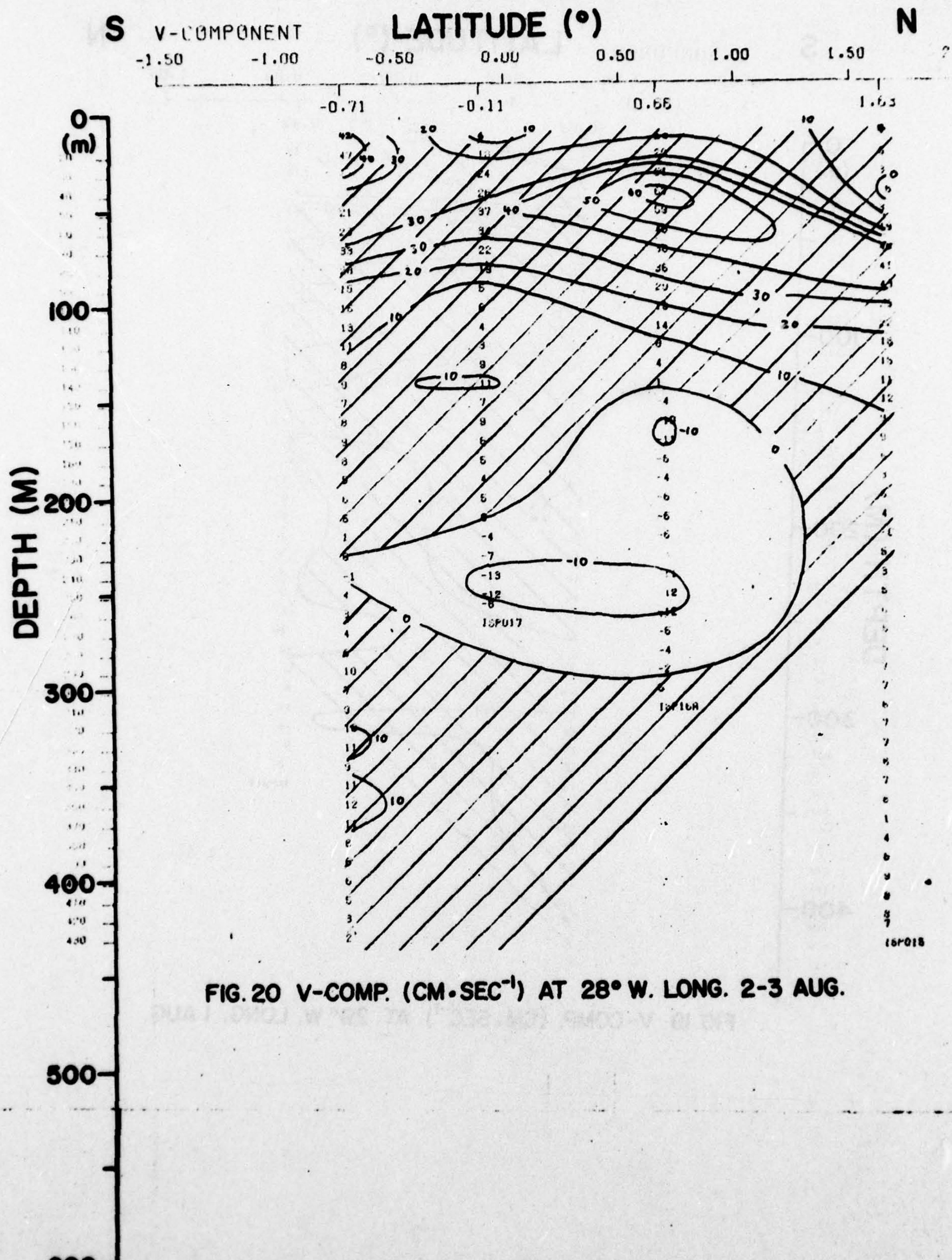


FIG. 20 V-COMP. (CM·SEC^{-1}) AT 28° W. LONG. 2-3 AUG.

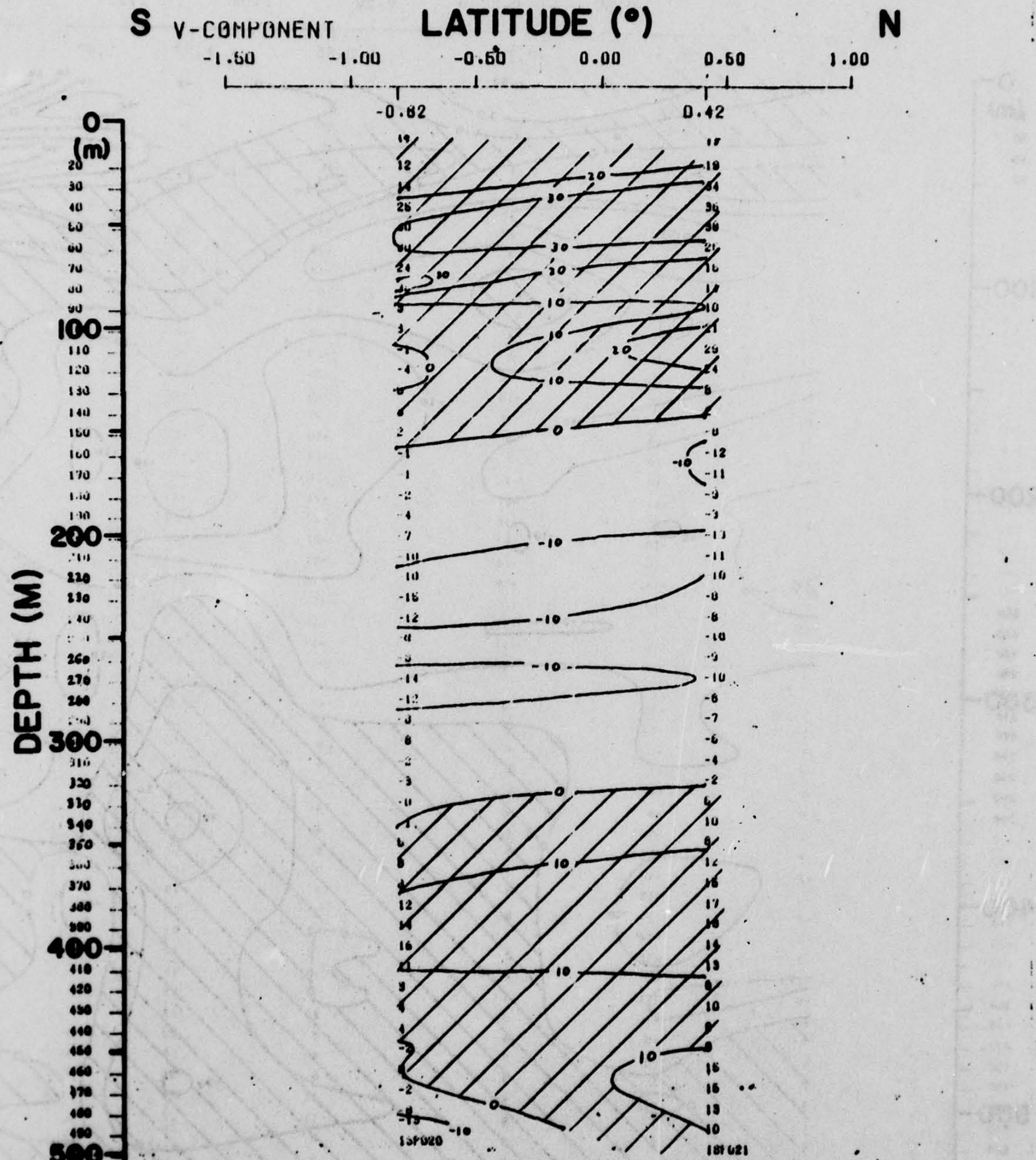


FIG. 21 V-COMP. (CM·SEC⁻¹) AT 29° W. LONG. 3-4 AUG.

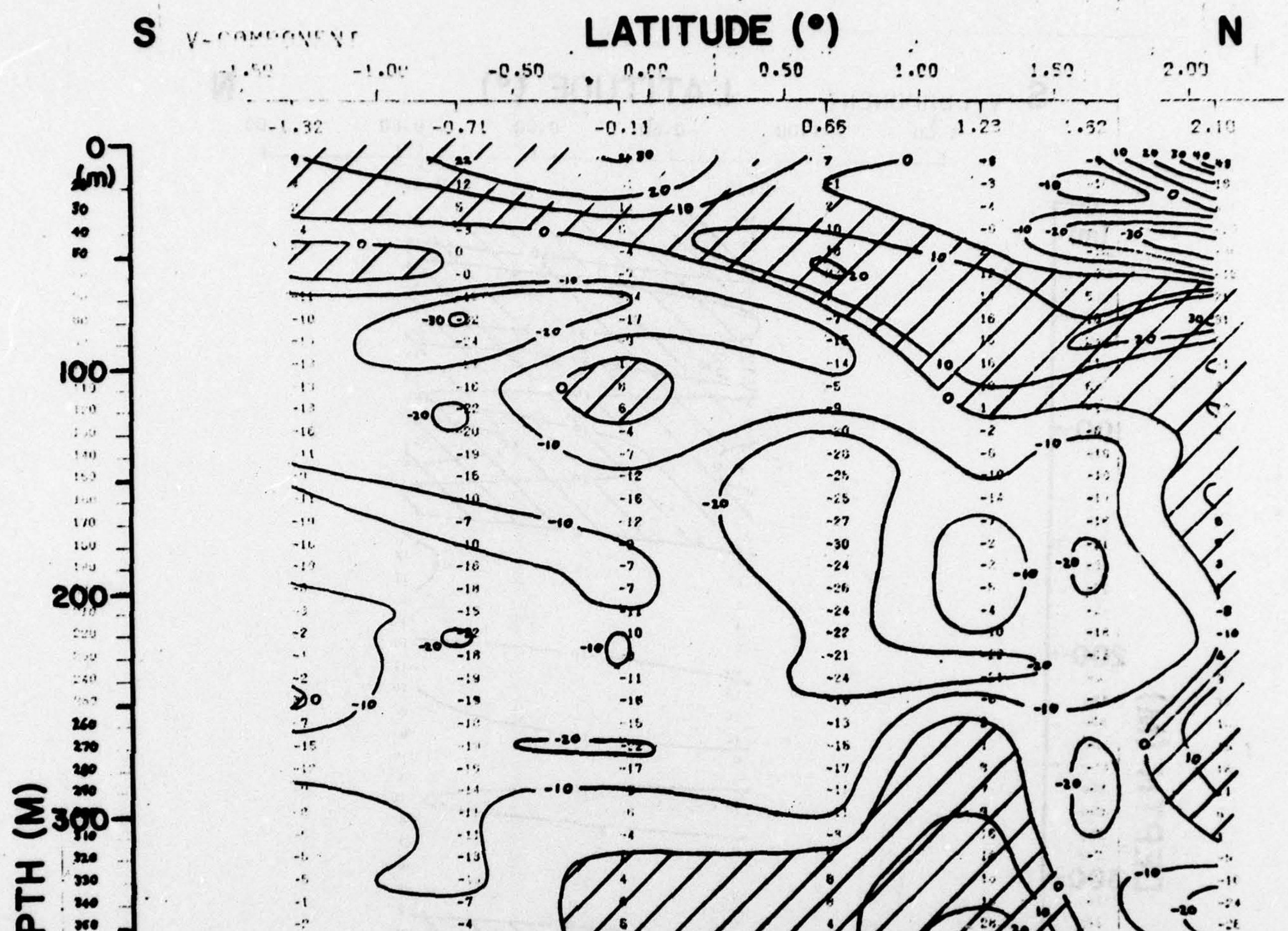


FIG. 22 V-COMP. (CM.SEC⁻¹) AT 28° W. LONG. 4-6 AUG.

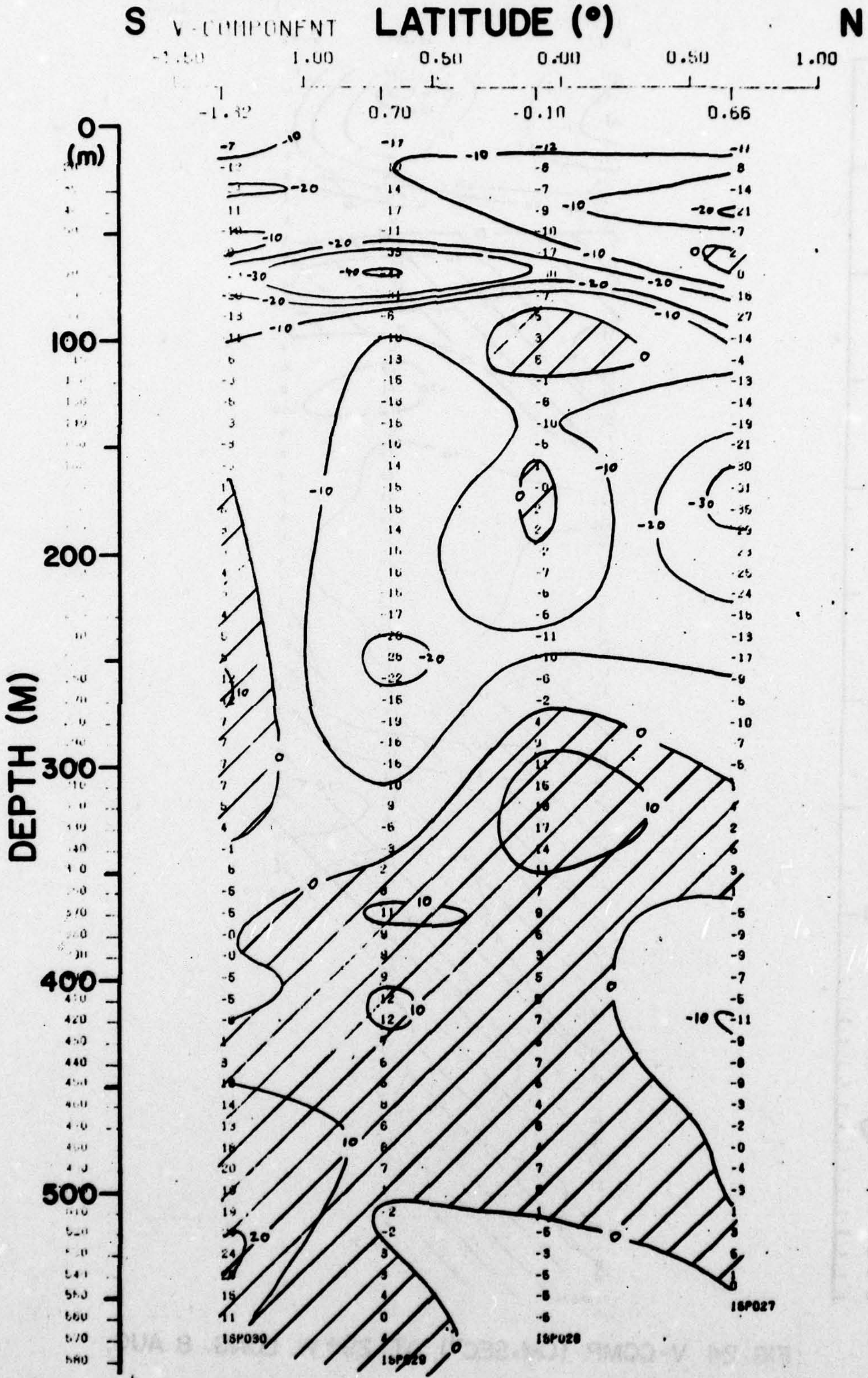


FIG. 23 V-COMP. (CM•SEC^{-1}) AT 28° W. LONG. 7-8 AUG.

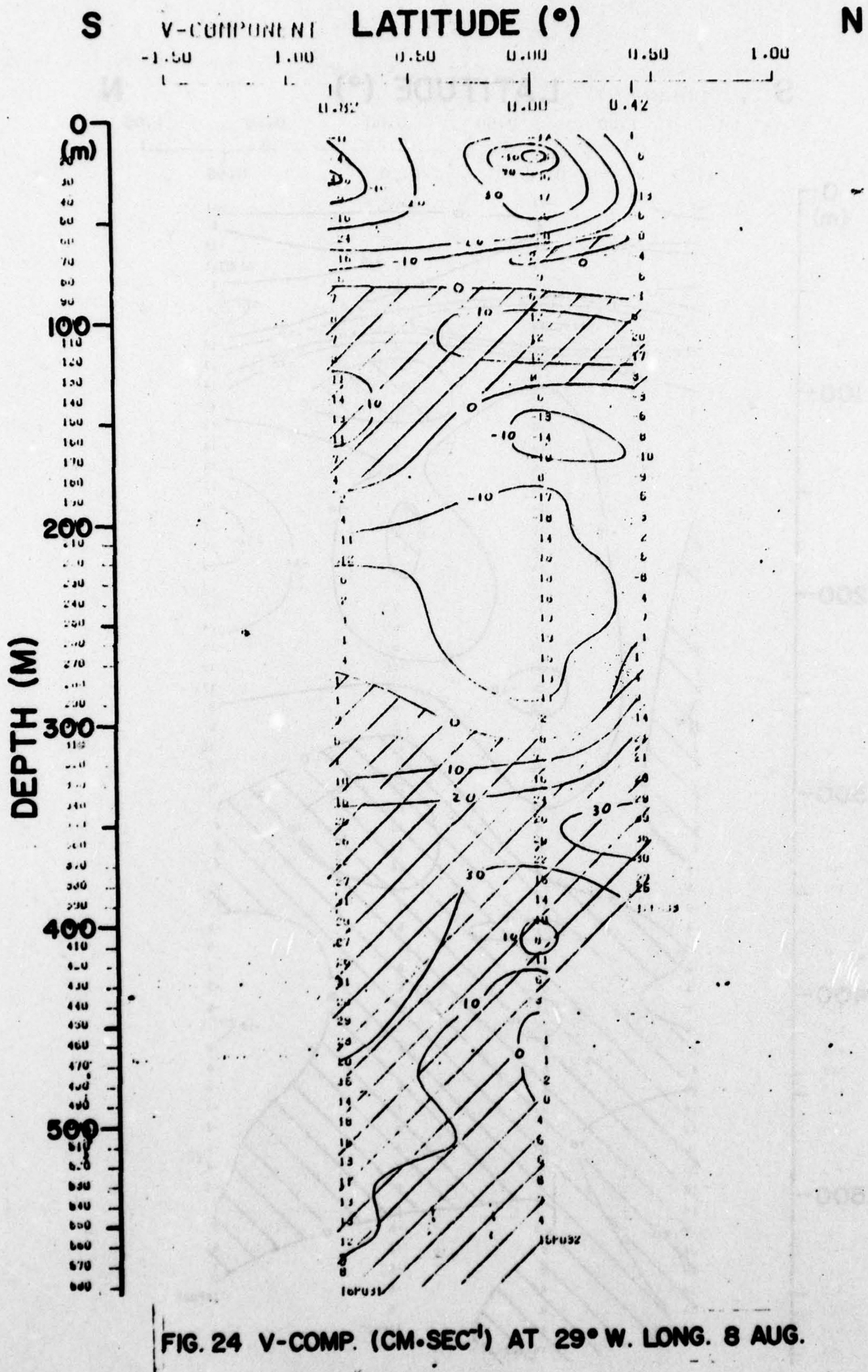


FIG. 24 V-COMP. (CM·SEC⁻¹) AT 29° W. LONG. 8 AUG.

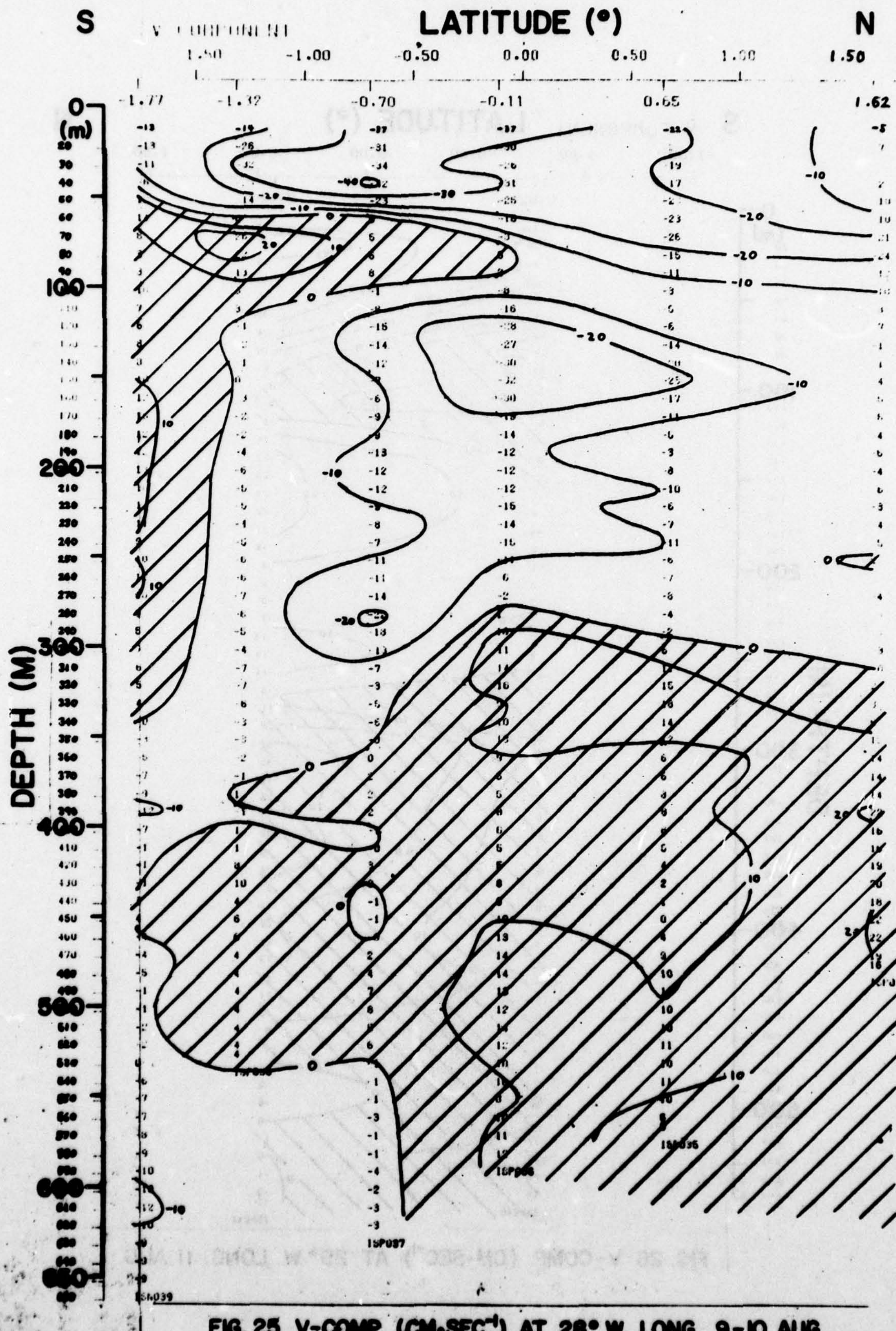


FIG. 25 V-COMP. (CM-SEC^{-1}) AT 28° W. LONG. 9-10 AUG.

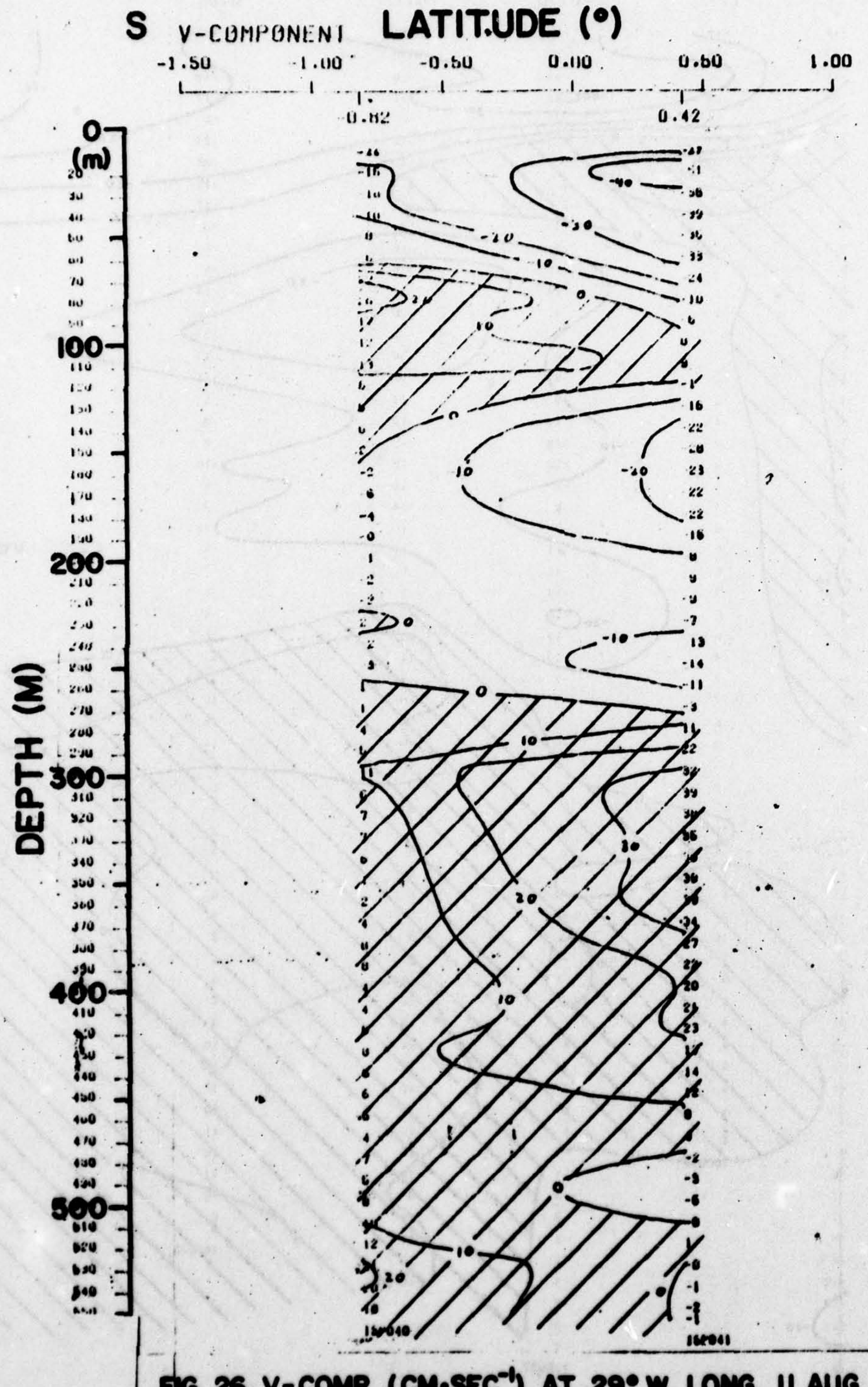


FIG. 26 V-COMP. (CM·SEC⁻¹) AT 29° W. LONG. 11 AUG.

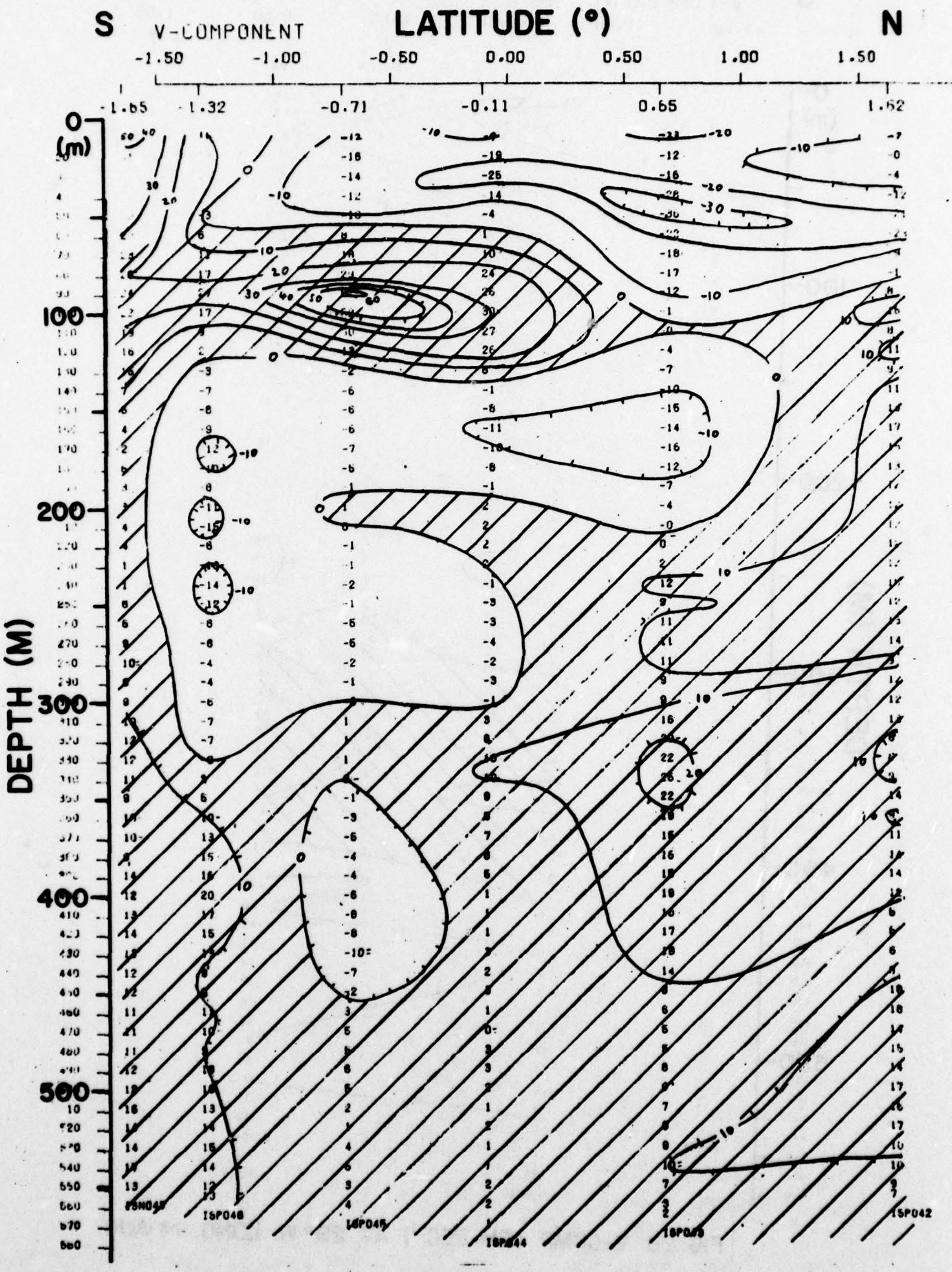


FIG. 27 V-COMP. (CM•SEC^{-1}) AT 28° W. LONG. 12-13 AUG.

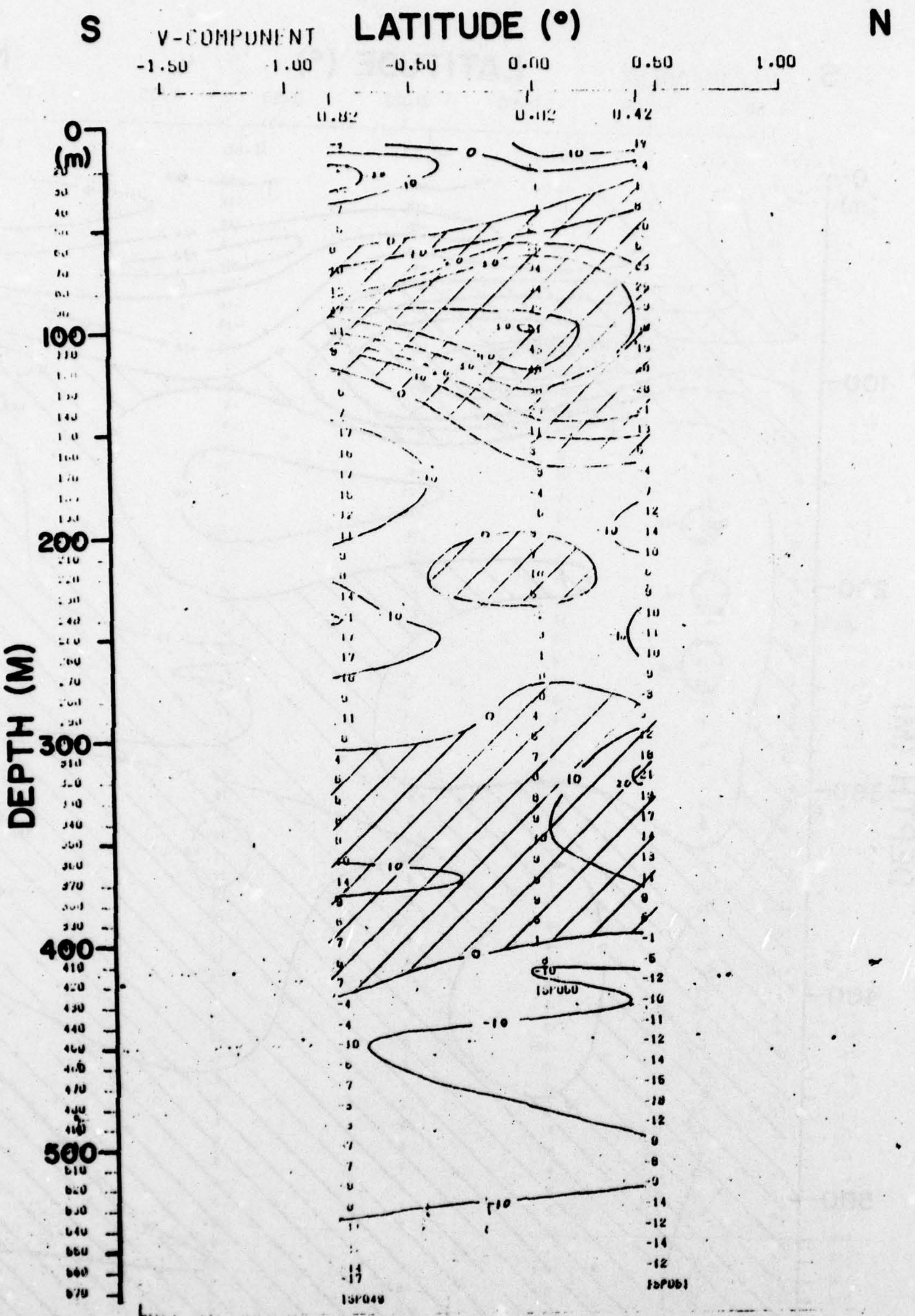


FIG. 28 V-COMP. (CM·SEC^{-1}) AT 29° W. LONG. 14 AUG.

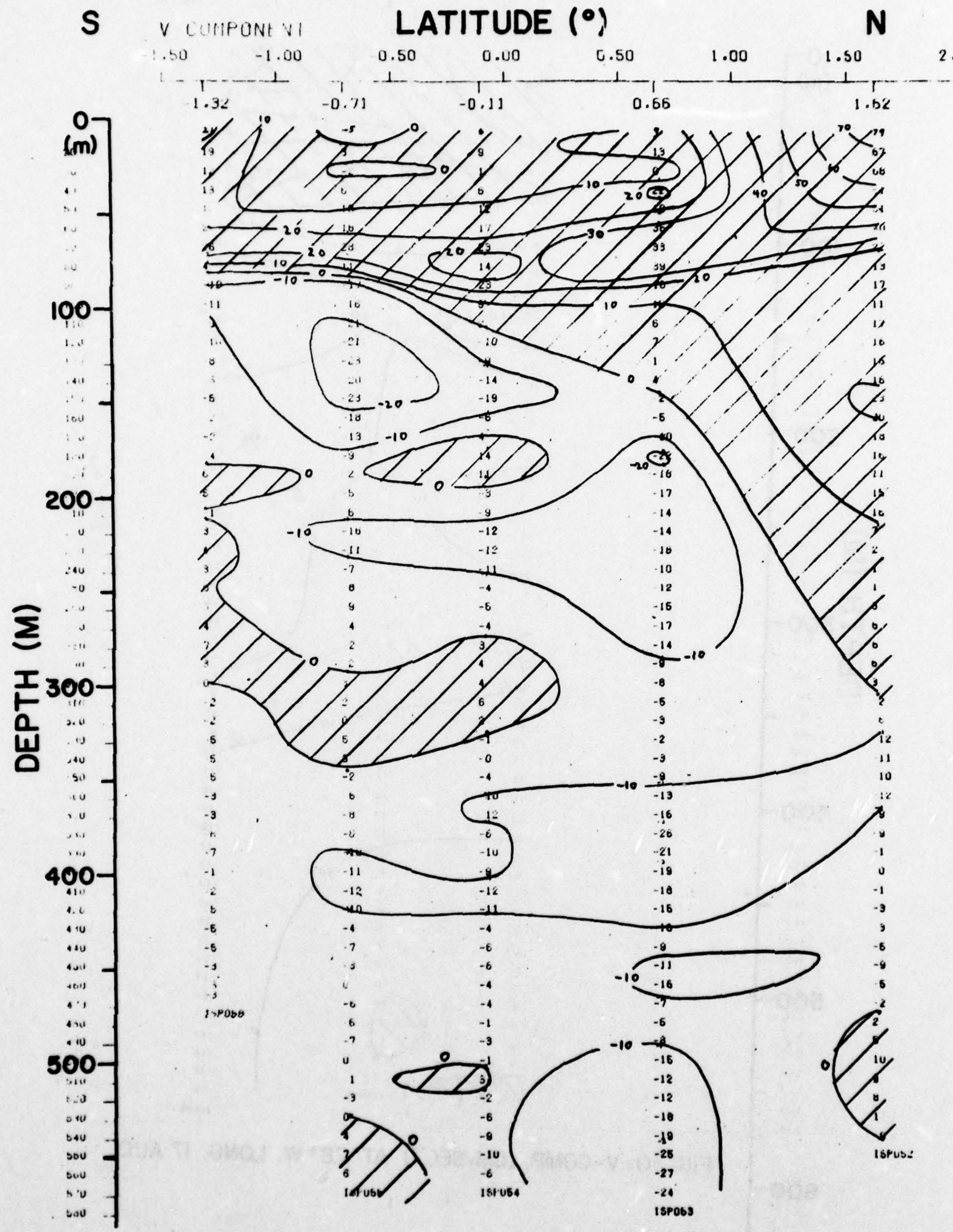


FIG. 29 V-COMP. (CM•SEC⁻¹) AT 28° W. LONG. 15-16 AUG.

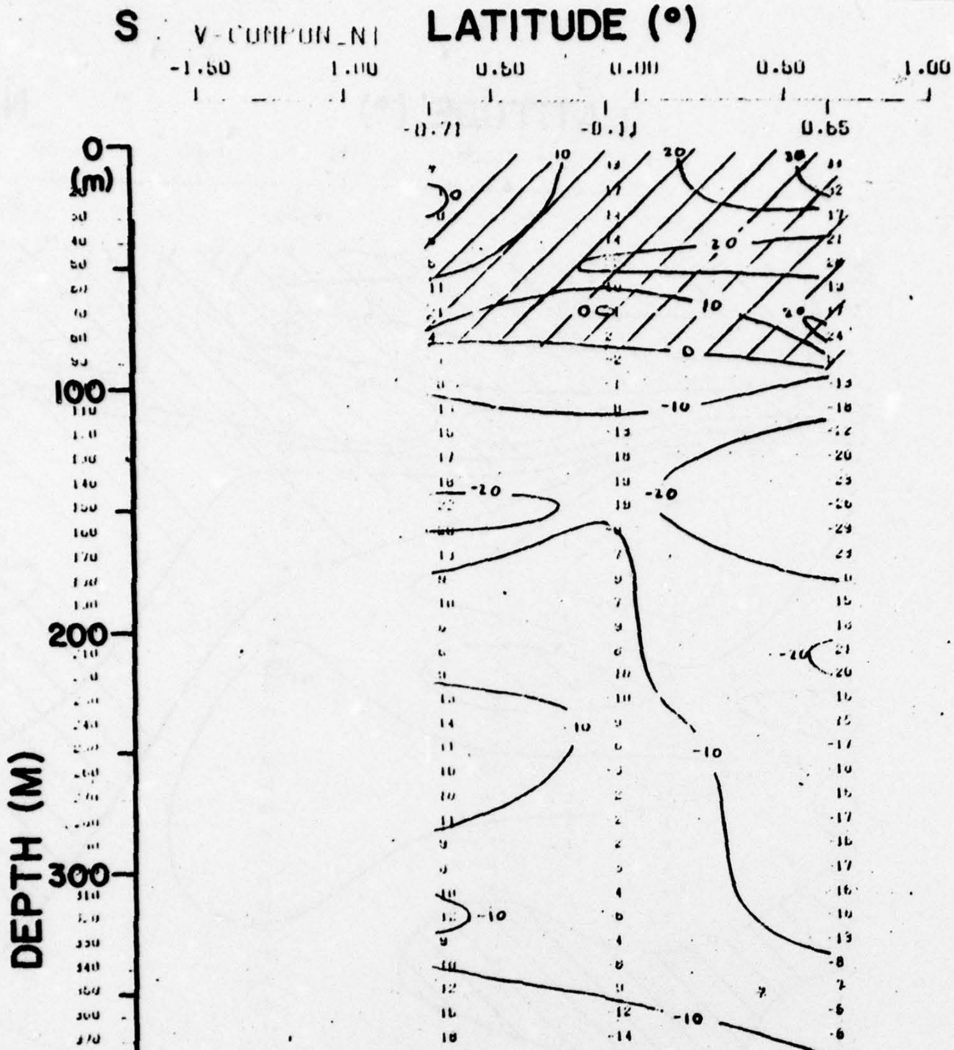


FIG. 30 V-COMP. (CM•SEC⁻¹) AT 28° W. LONG. 17 AUG.

TEMPERATURE

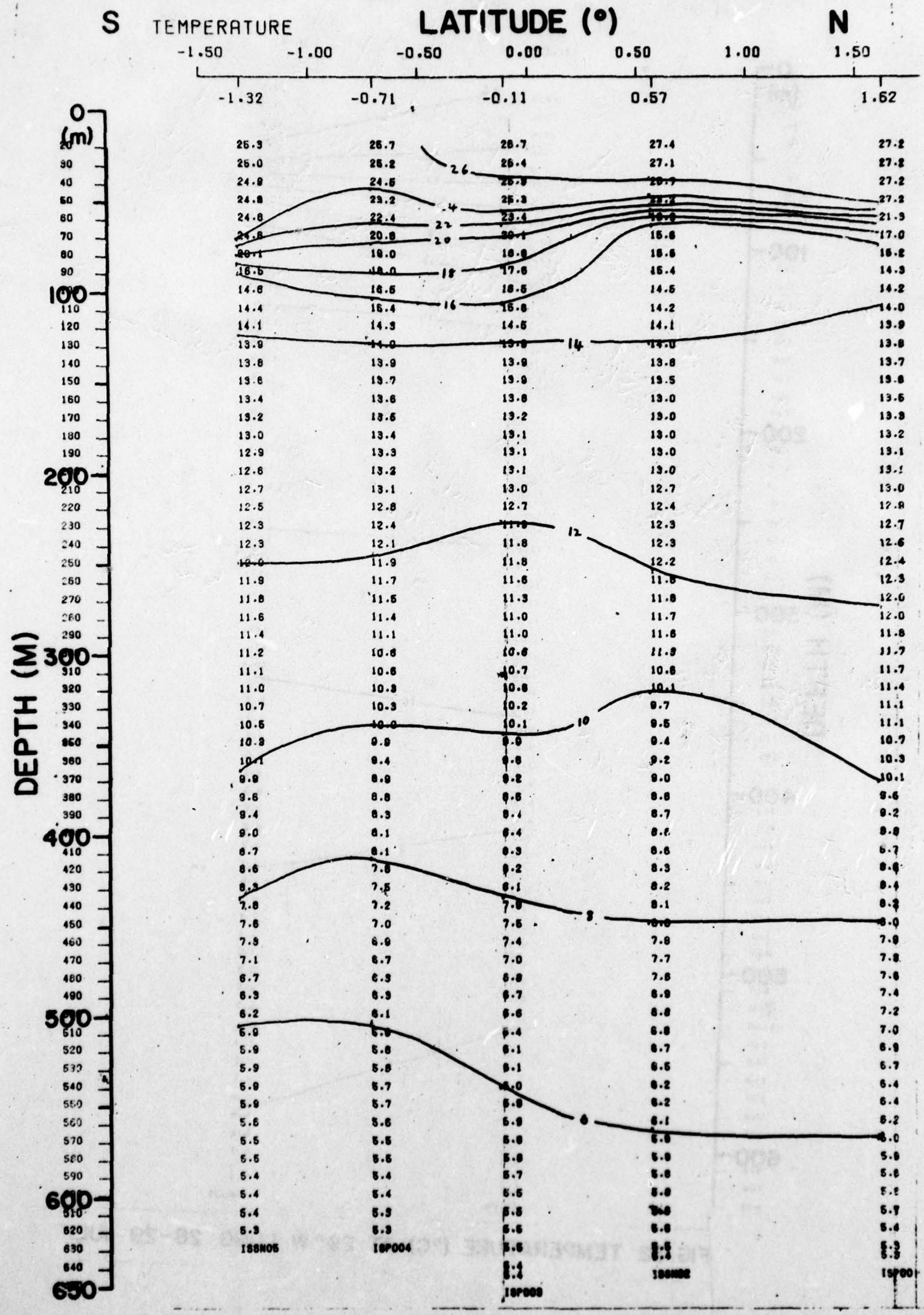


FIG. 31 TEMPERATURE (°C) AT 28° W. LONG. 26-28 JUL.

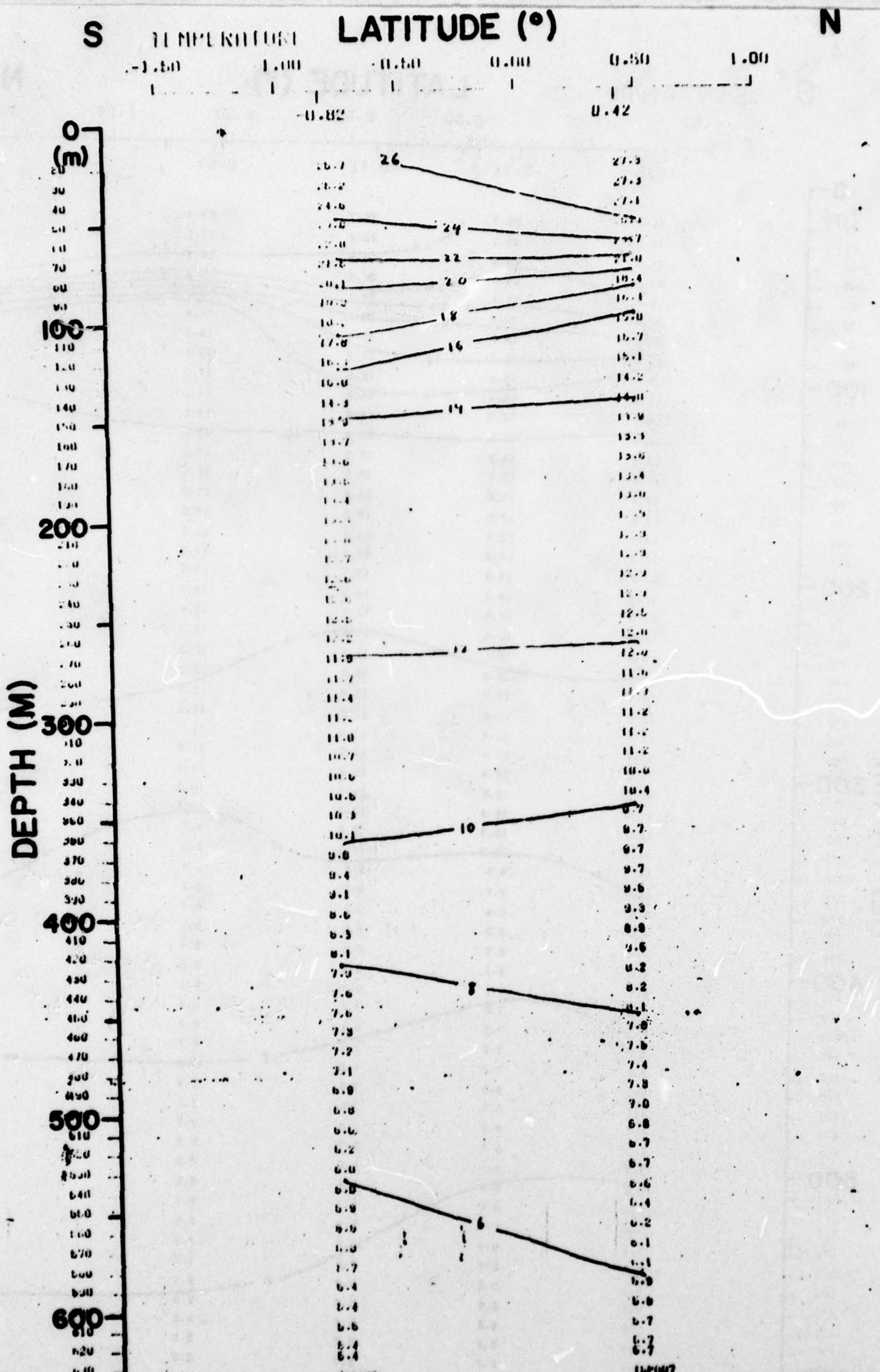


FIG. 32 TEMPERATURE (°C) AT 29° W. LONG. 28-29 JUL.

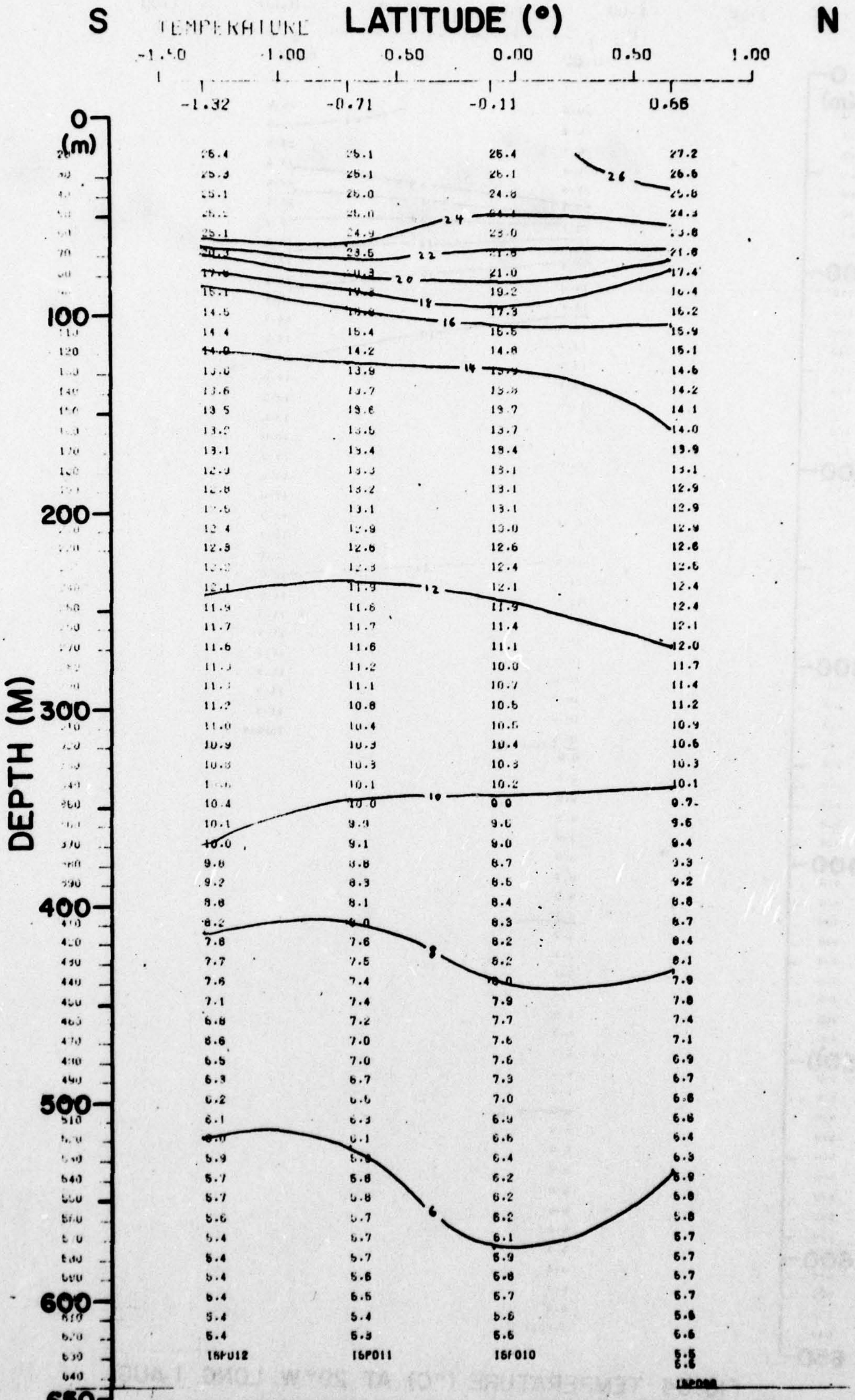


FIG. 33 TEMPERATURE (°C) AT 28° W. LONG. 30 JUL.

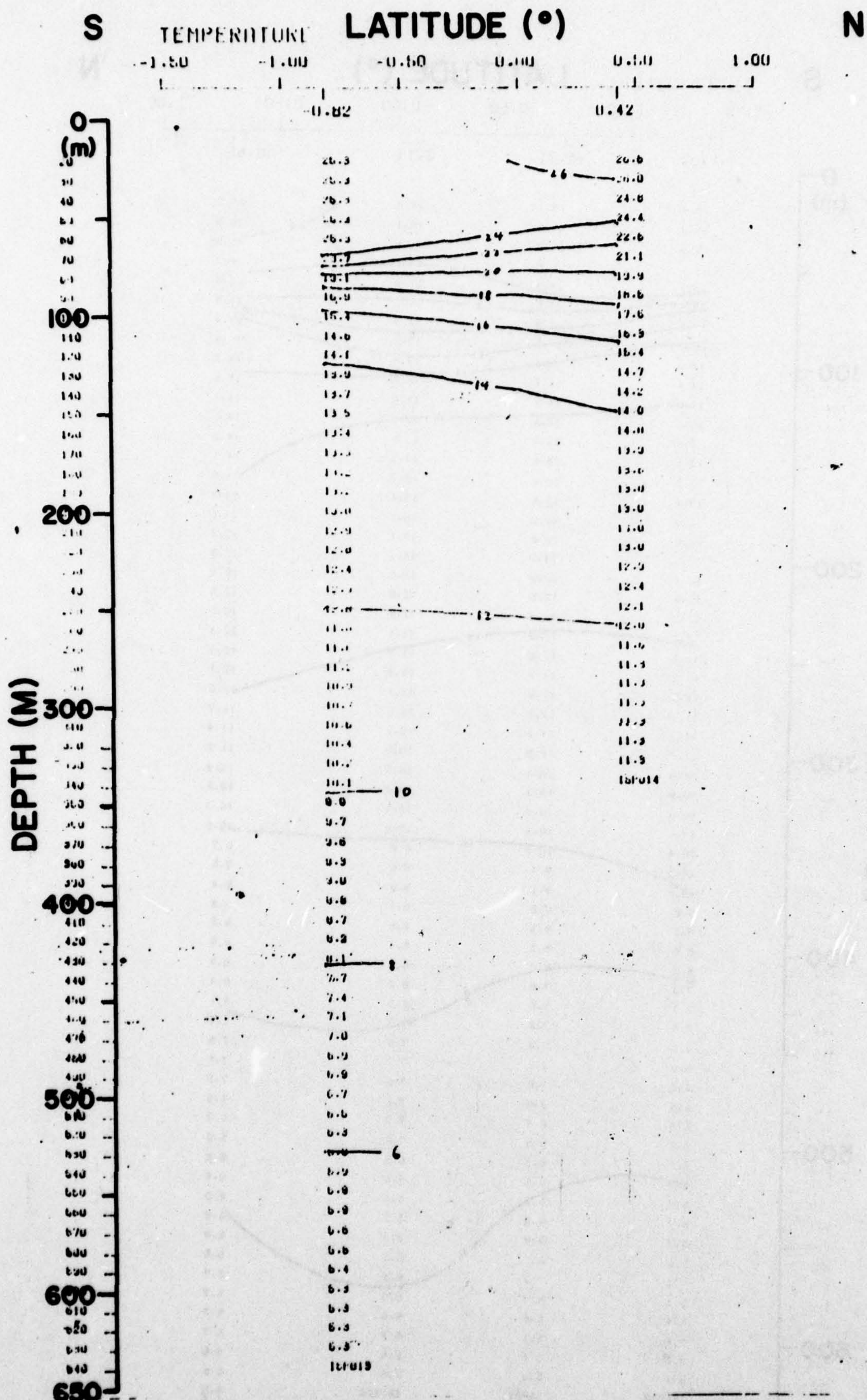


FIG. 34 TEMPERATURE (°C) AT 29° W. LONG. 1 AUG.

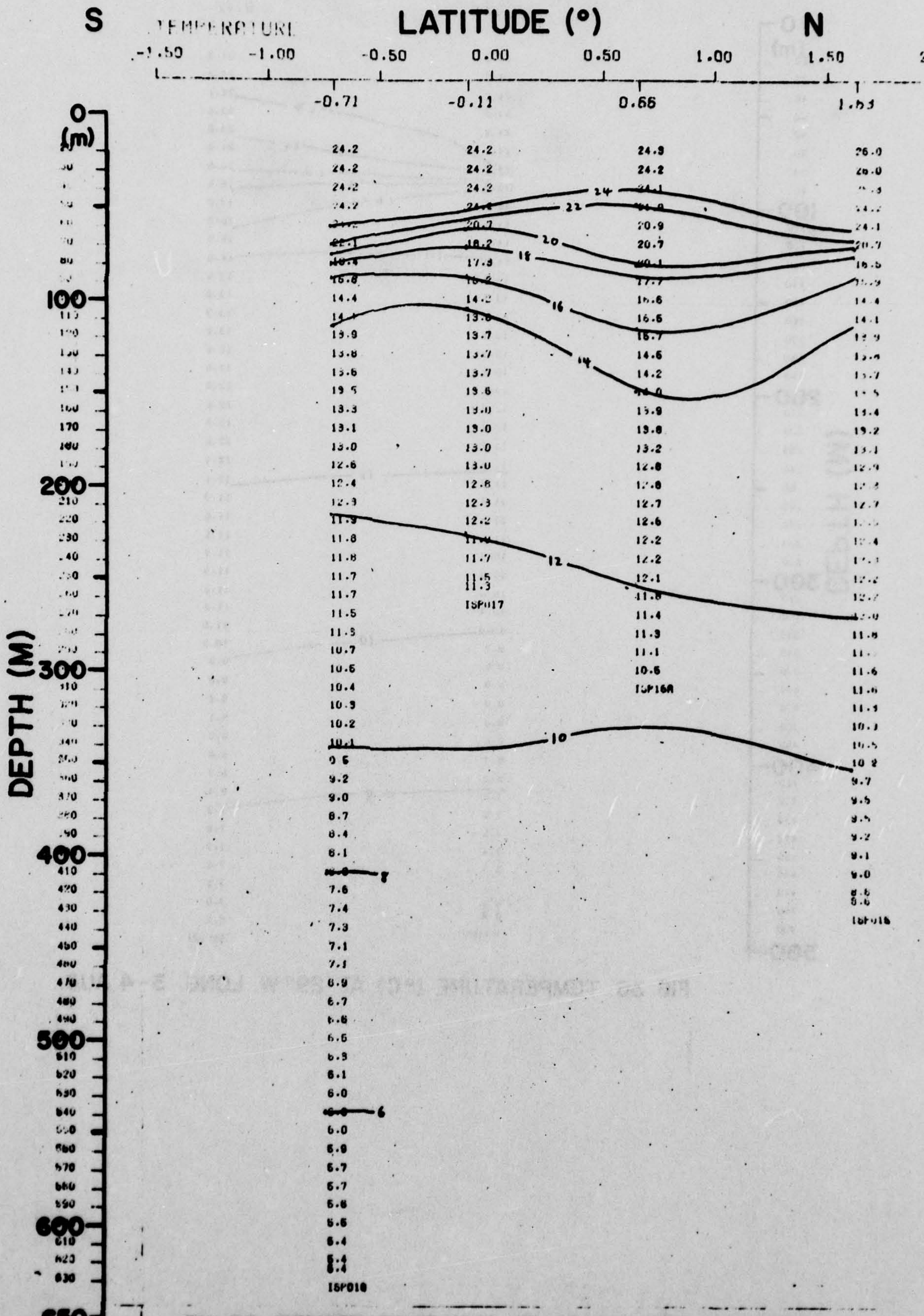


FIG. 35 TEMPERATURE (°C) AT 28° W. LONG. 2-3 AUG.

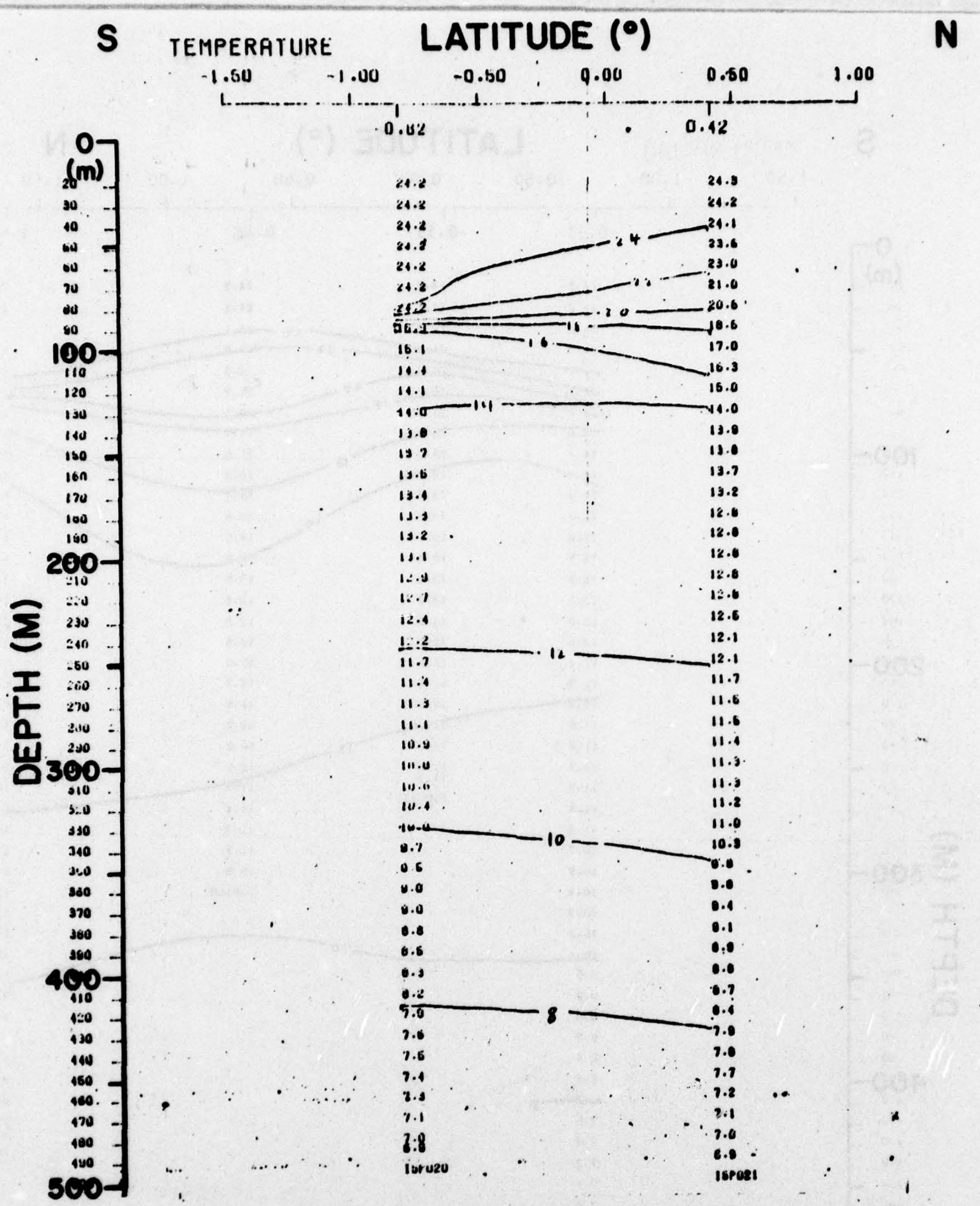


FIG. 36 TEMPERATURE (°C) AT 29° W. LONG. 3-4 AUG.

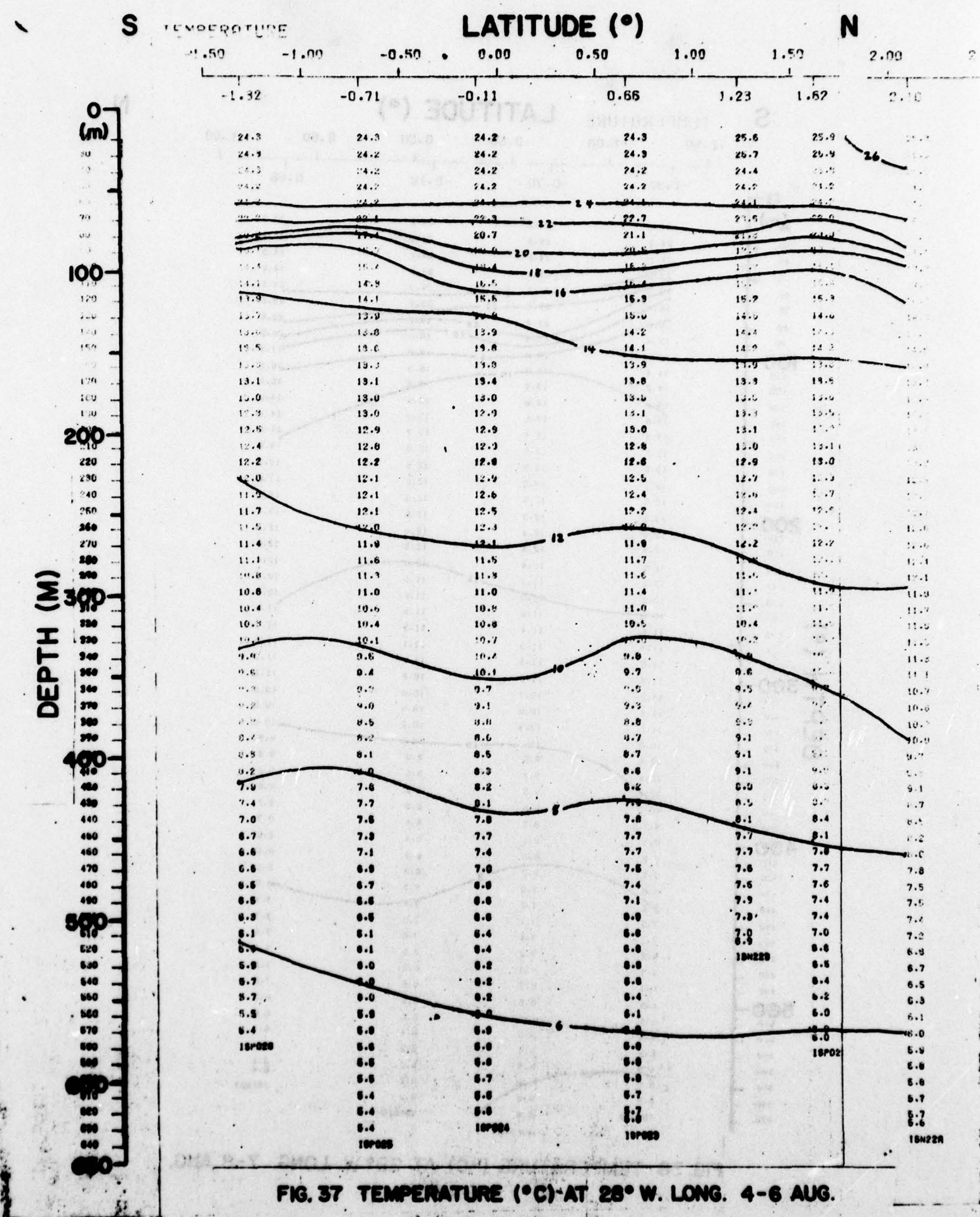


FIG. 37 TEMPERATURE (°C) AT 28° W. LONG. 4-6 AUG.

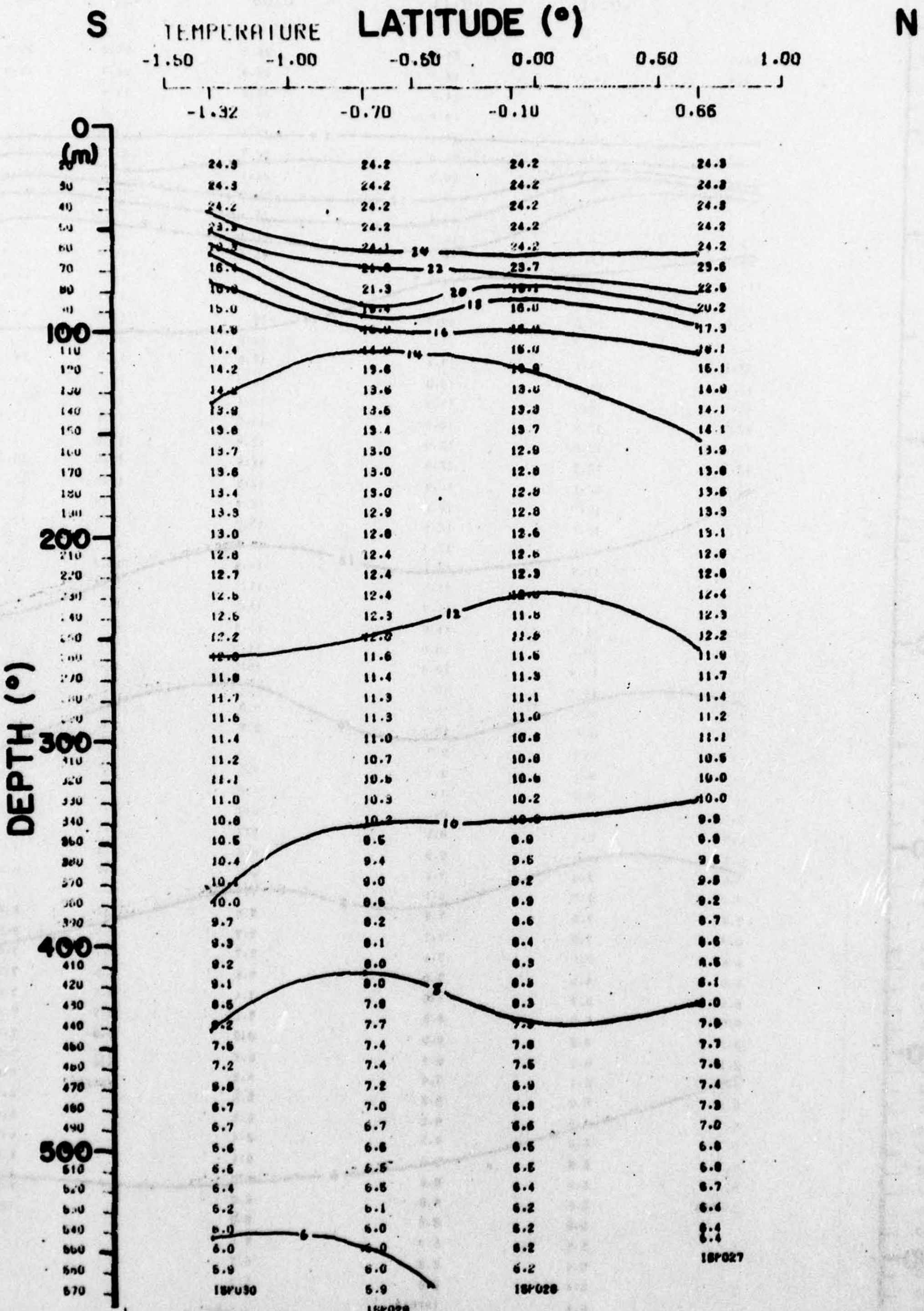


FIG. 38 TEMPERATURE (°C) AT 28° W. LONG. 7-8 AUG.

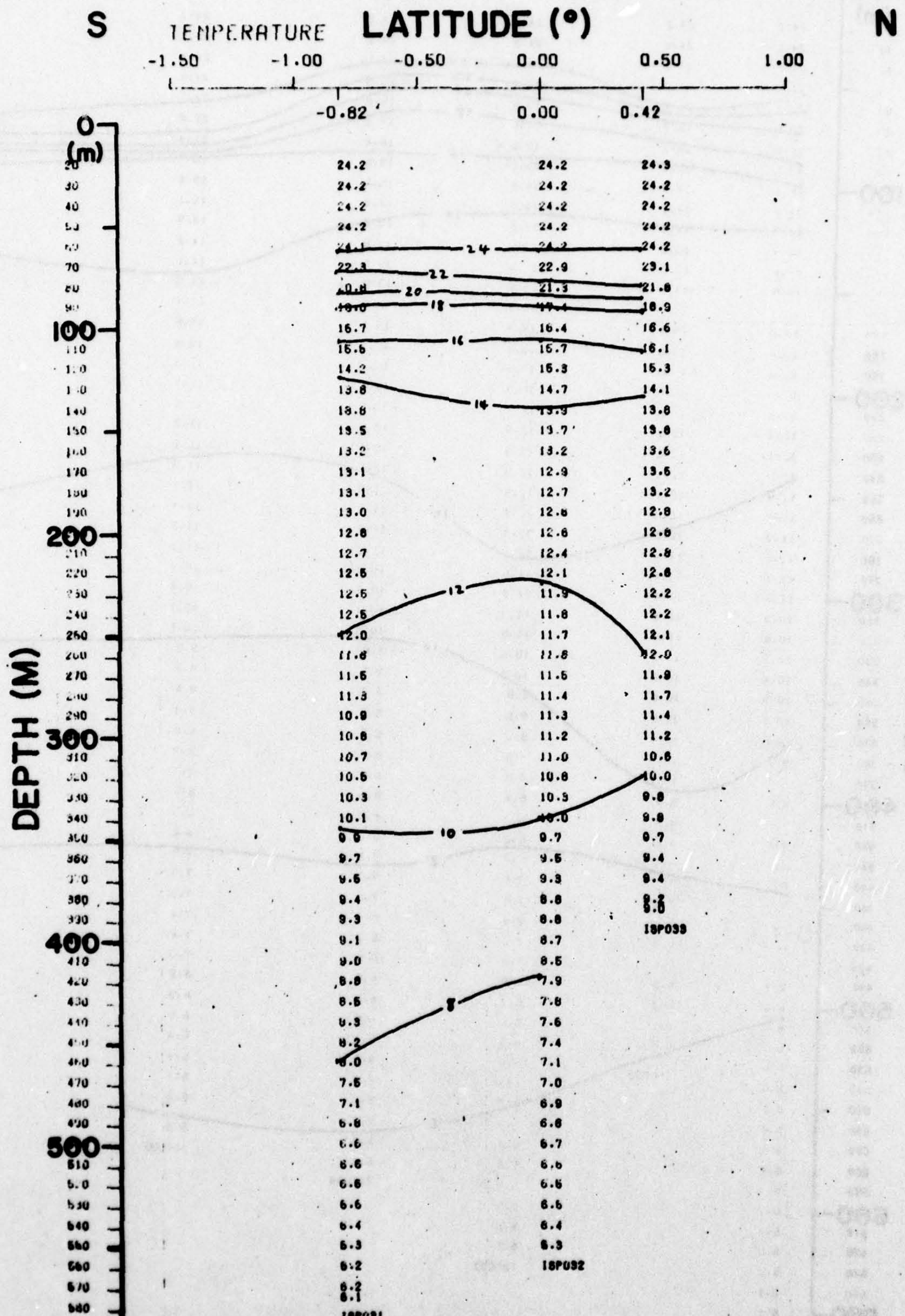


FIG. 39 TEMPERATURE (°C) AT 29° W. LONG. 8 AUG.

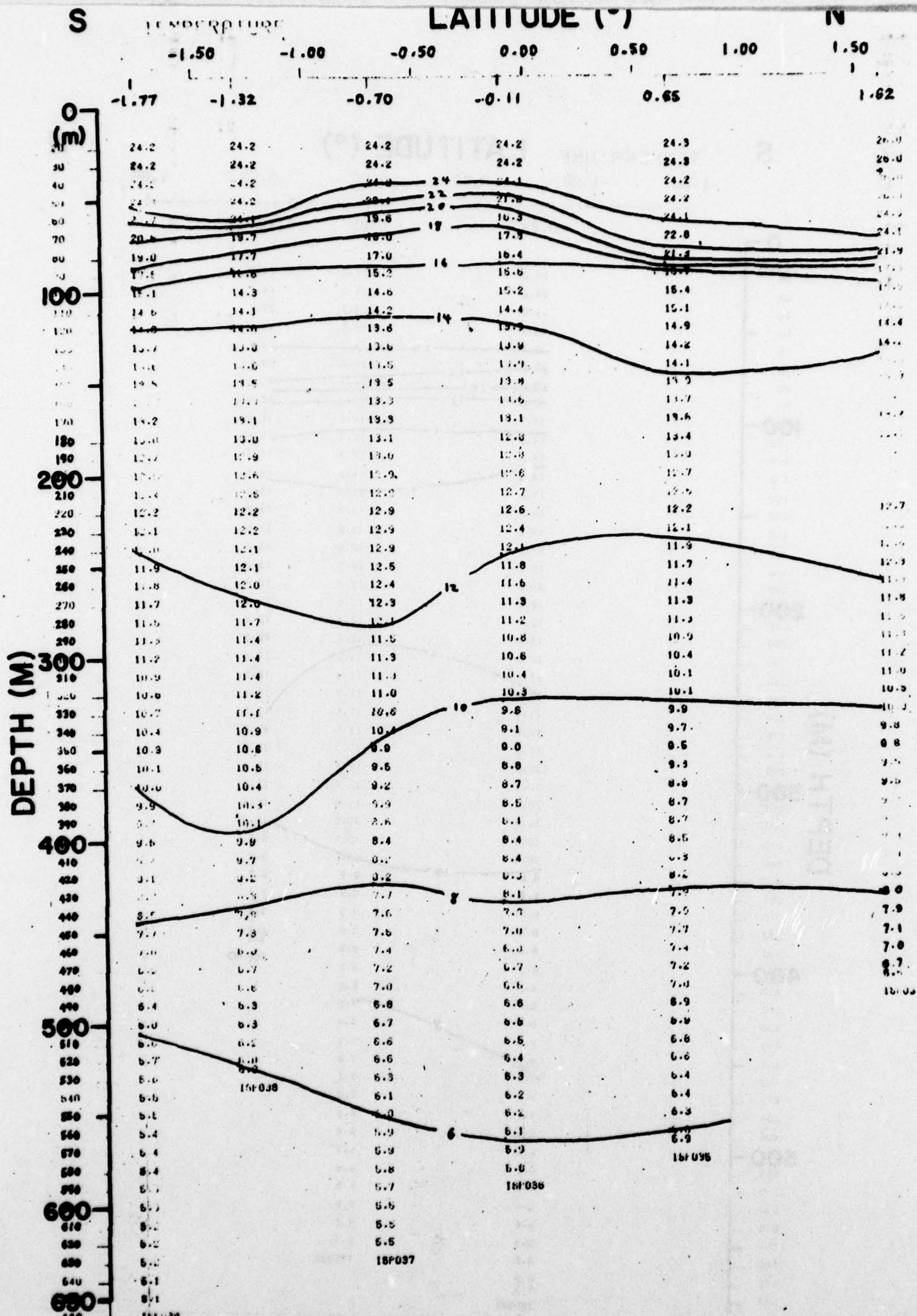


FIG. 40 TEMPERATURE (°C) AT 28° W. LONG. 9-10 AUG.

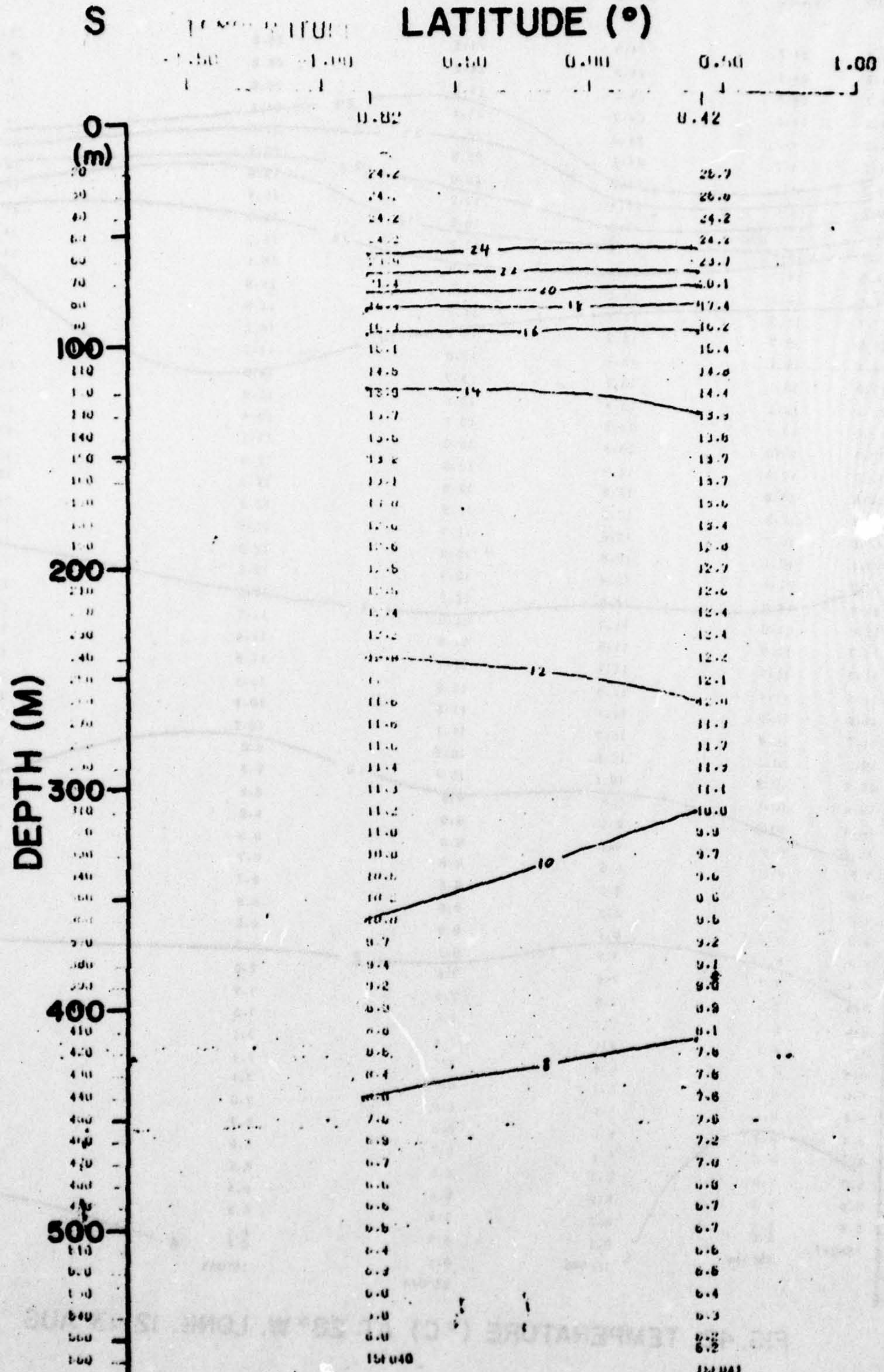


FIG. 41 TEMPERATURE (°C) AT 29° W. LONG. 11 AUG.

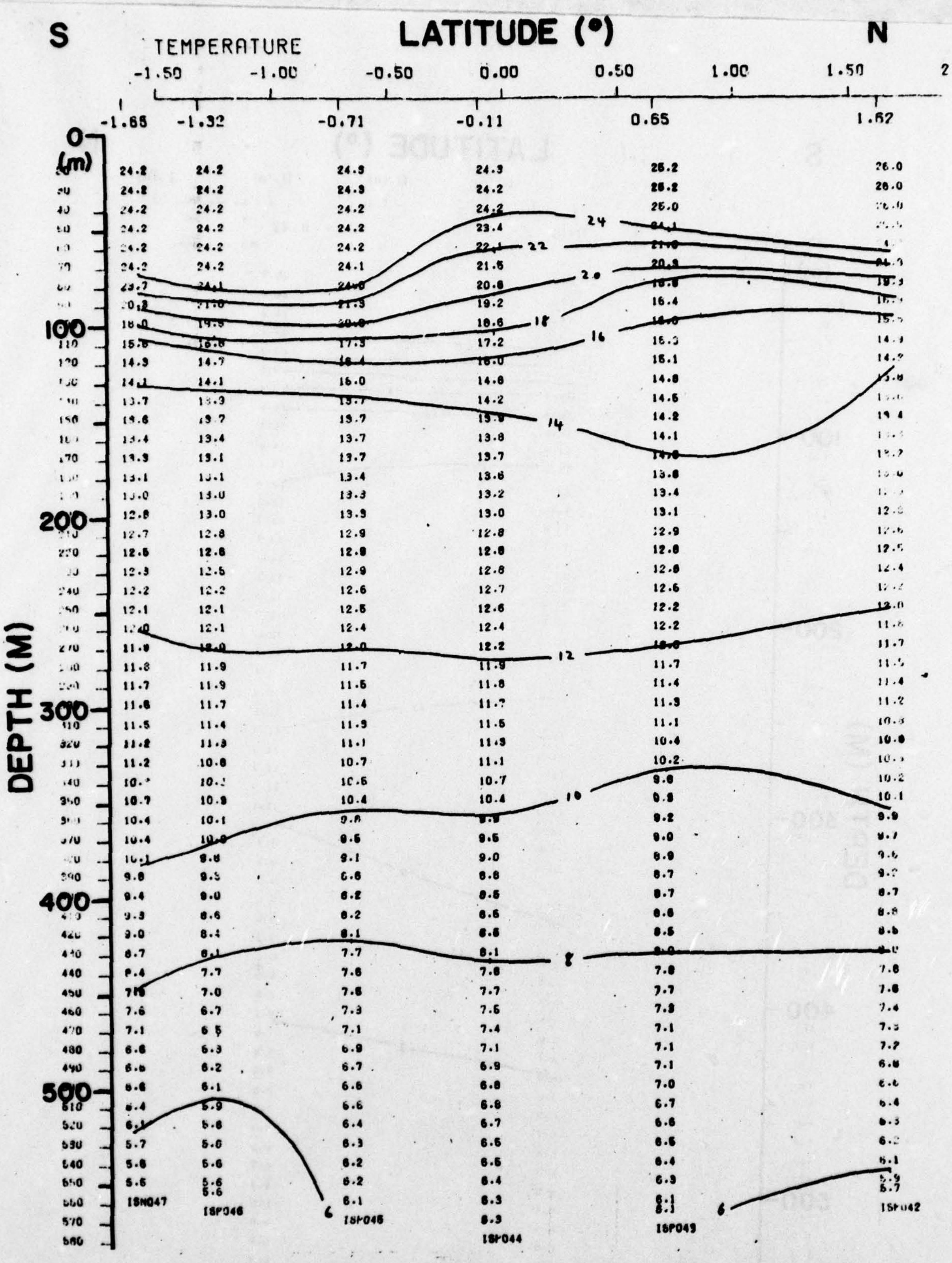


FIG. 42 TEMPERATURE (°C) AT 28° W. LONG. 12-13 AUG.

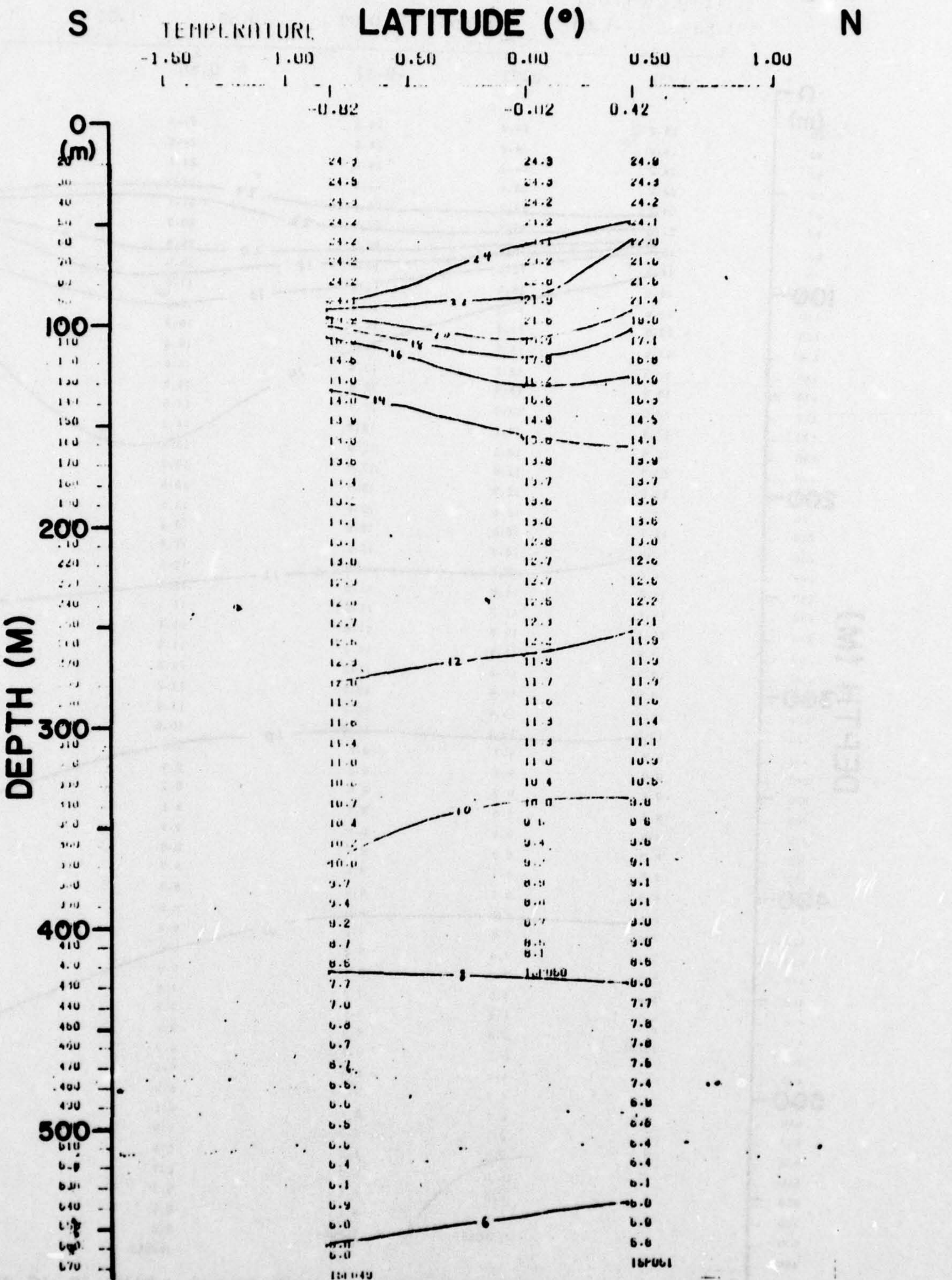


FIG. 43 TEMPERATURE (°C) AT 29° W. LONG. 14 AUG.

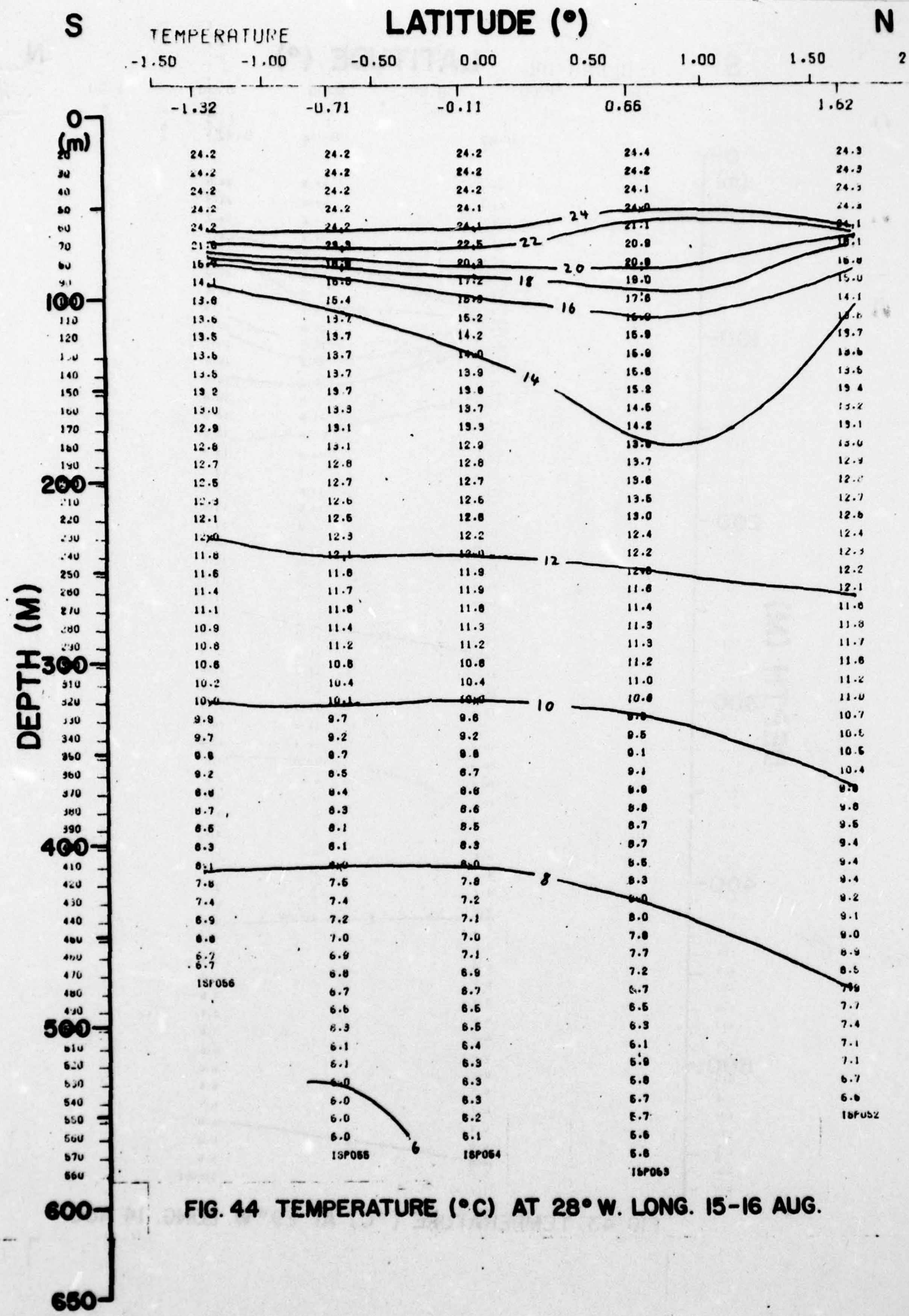


FIG. 44 TEMPERATURE (°C) AT 28° W. LONG. 15-16 AUG.

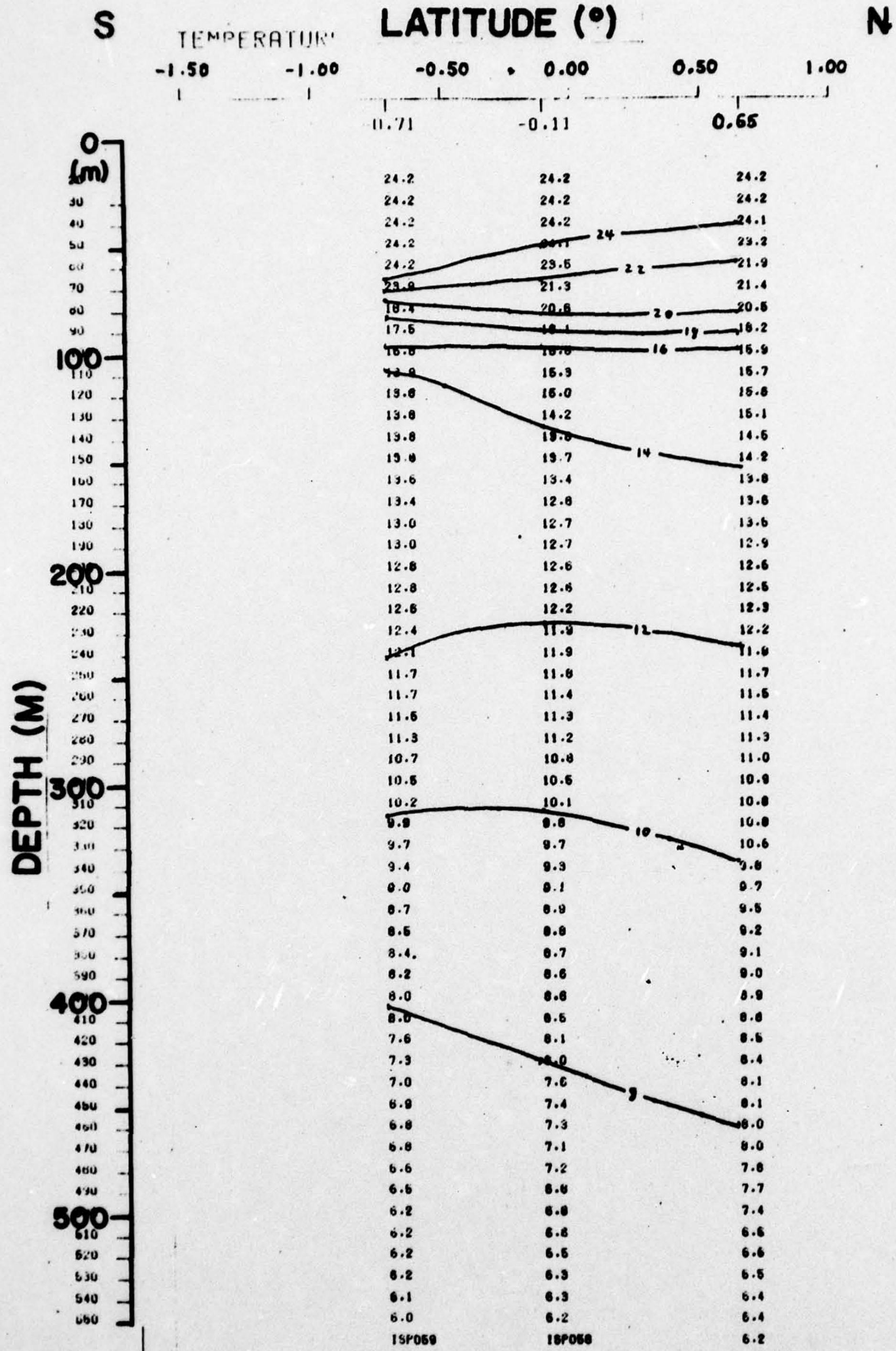


FIG. 45 TEMPERATURE (°C) AT 28° W. LONG. 17 AUG.

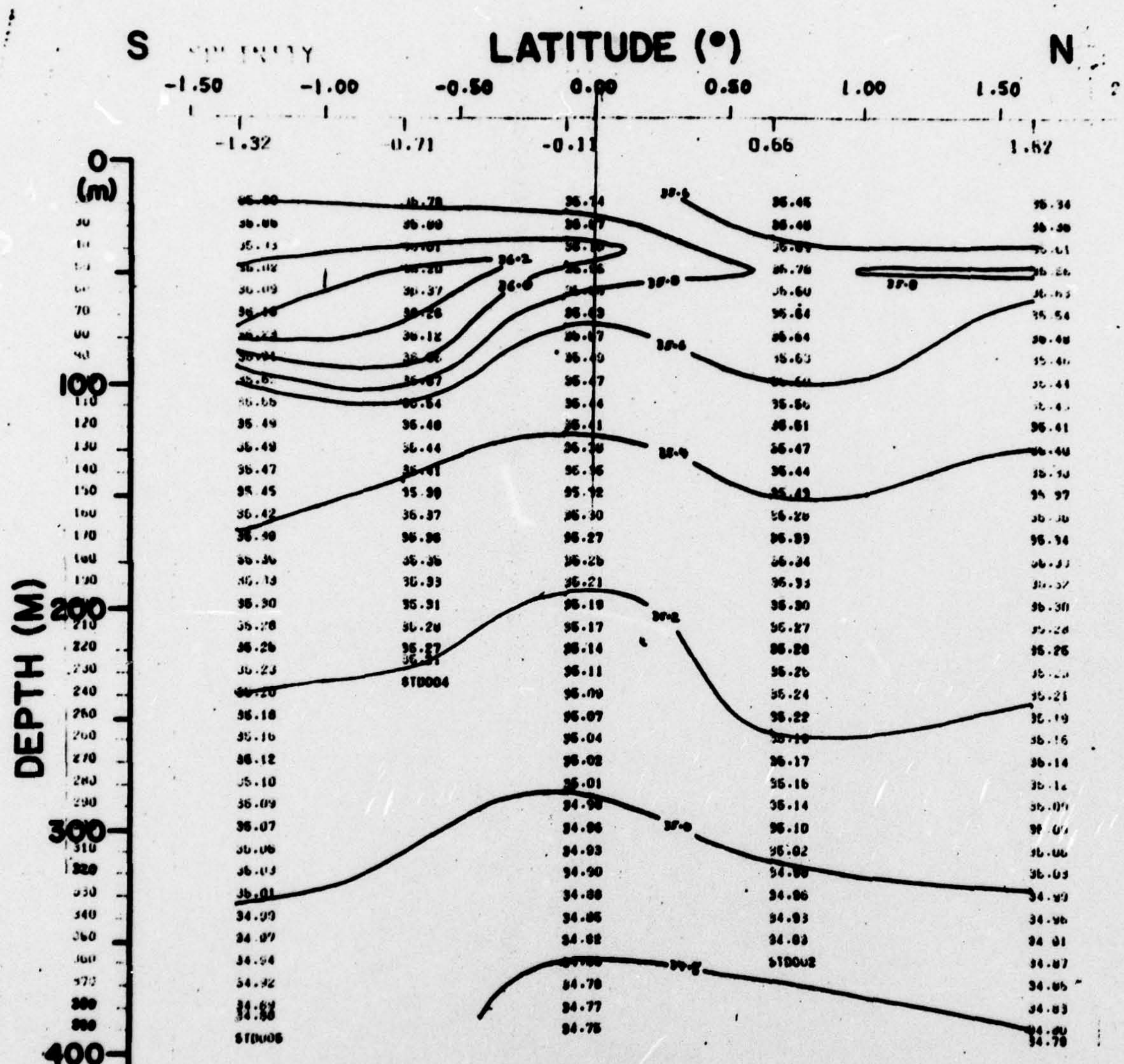


FIG. 46 SALINITY (‰) AT 28° W. LONG. 26-28 JUL.

SALINITY

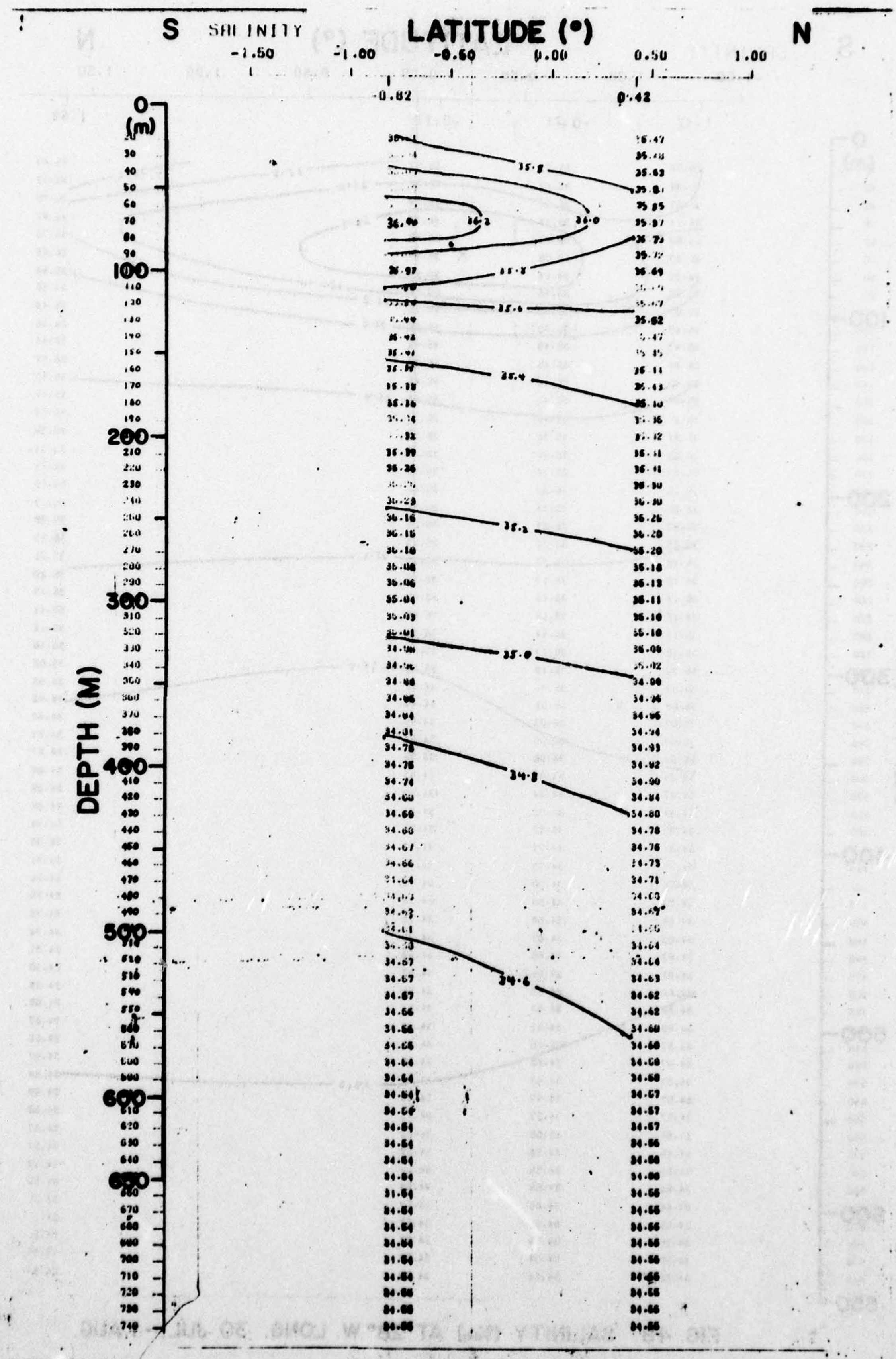


FIG. 47 SALINITY (‰) AT 29° W. LONG. 28-29 JUL.

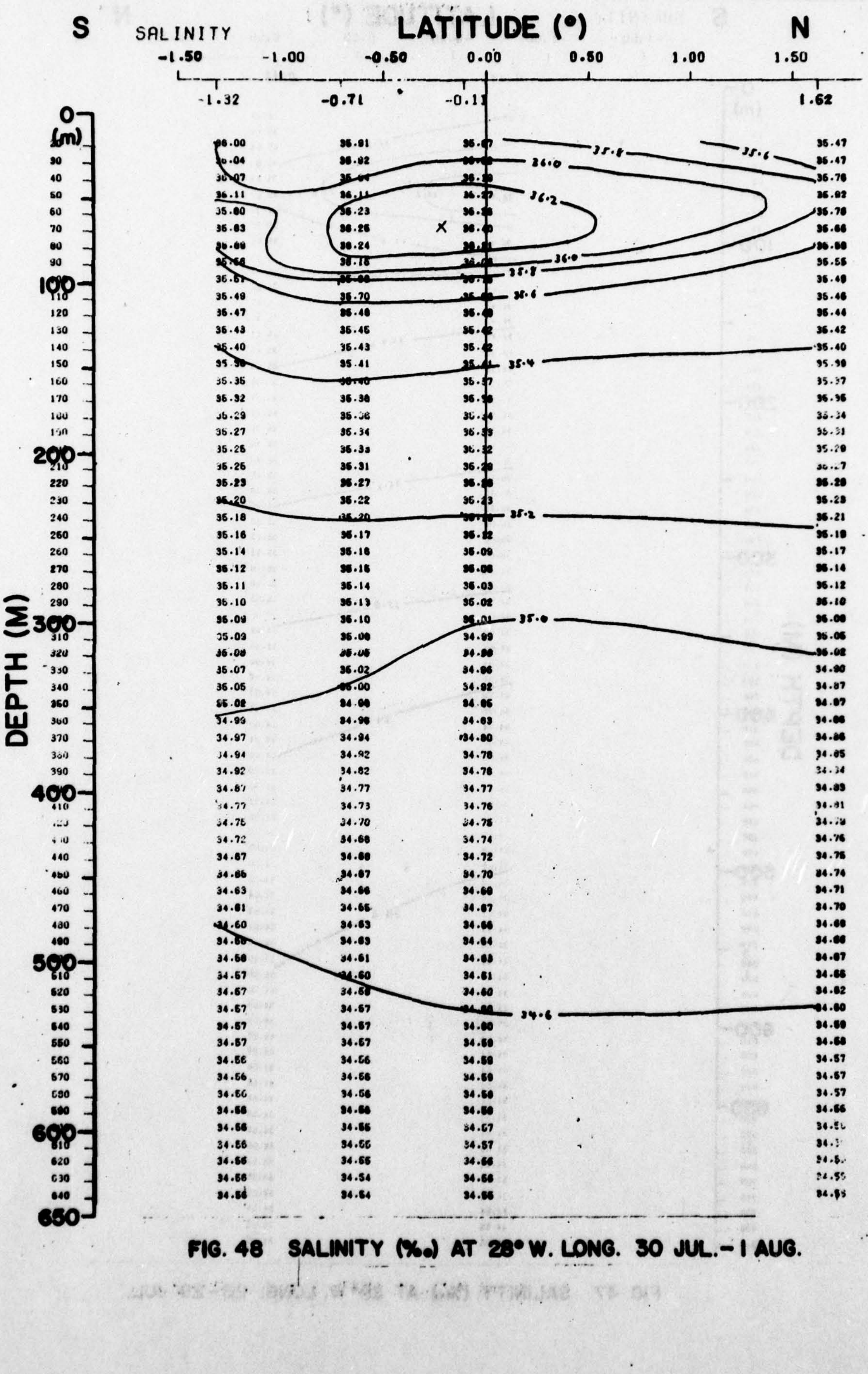


FIG. 48 SALINITY (‰) AT 28° W. LONG. 30 JUL.-1 AUG.

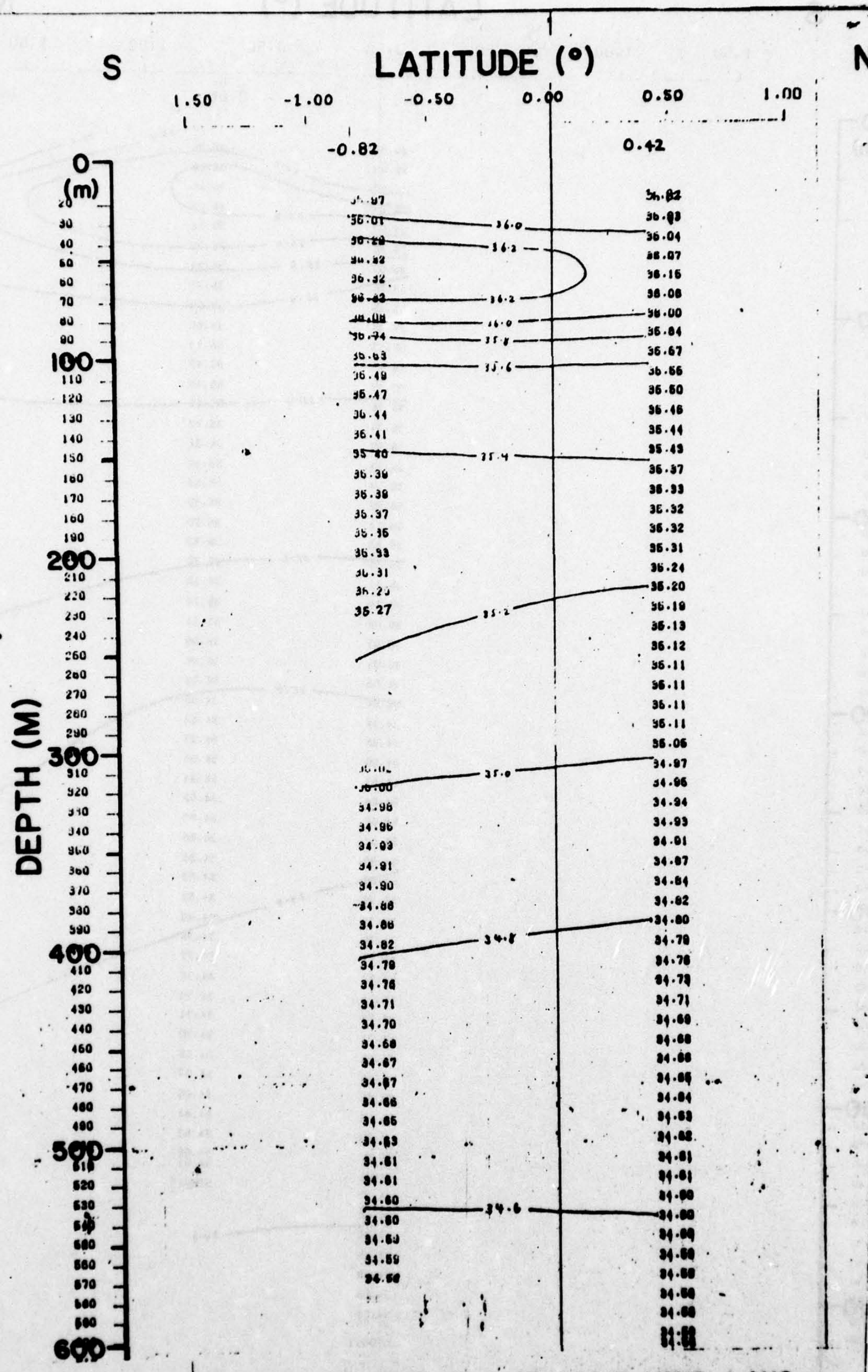


FIG. 49 SALINITY (‰) AT 29° W. LONG. 1 AUG.

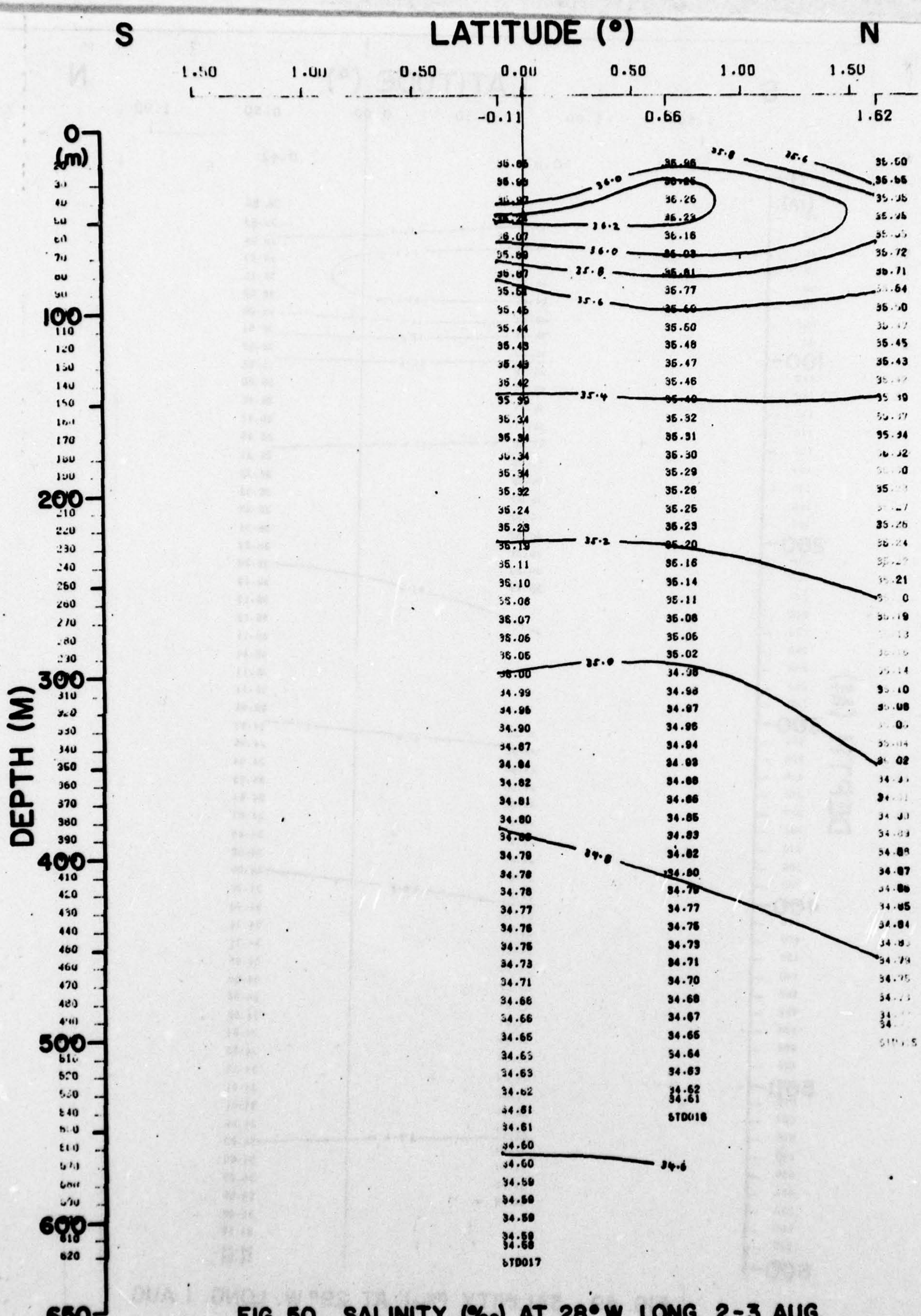


FIG. 50 SALINITY (‰) AT 28° W. LONG. 2-3 AUG.

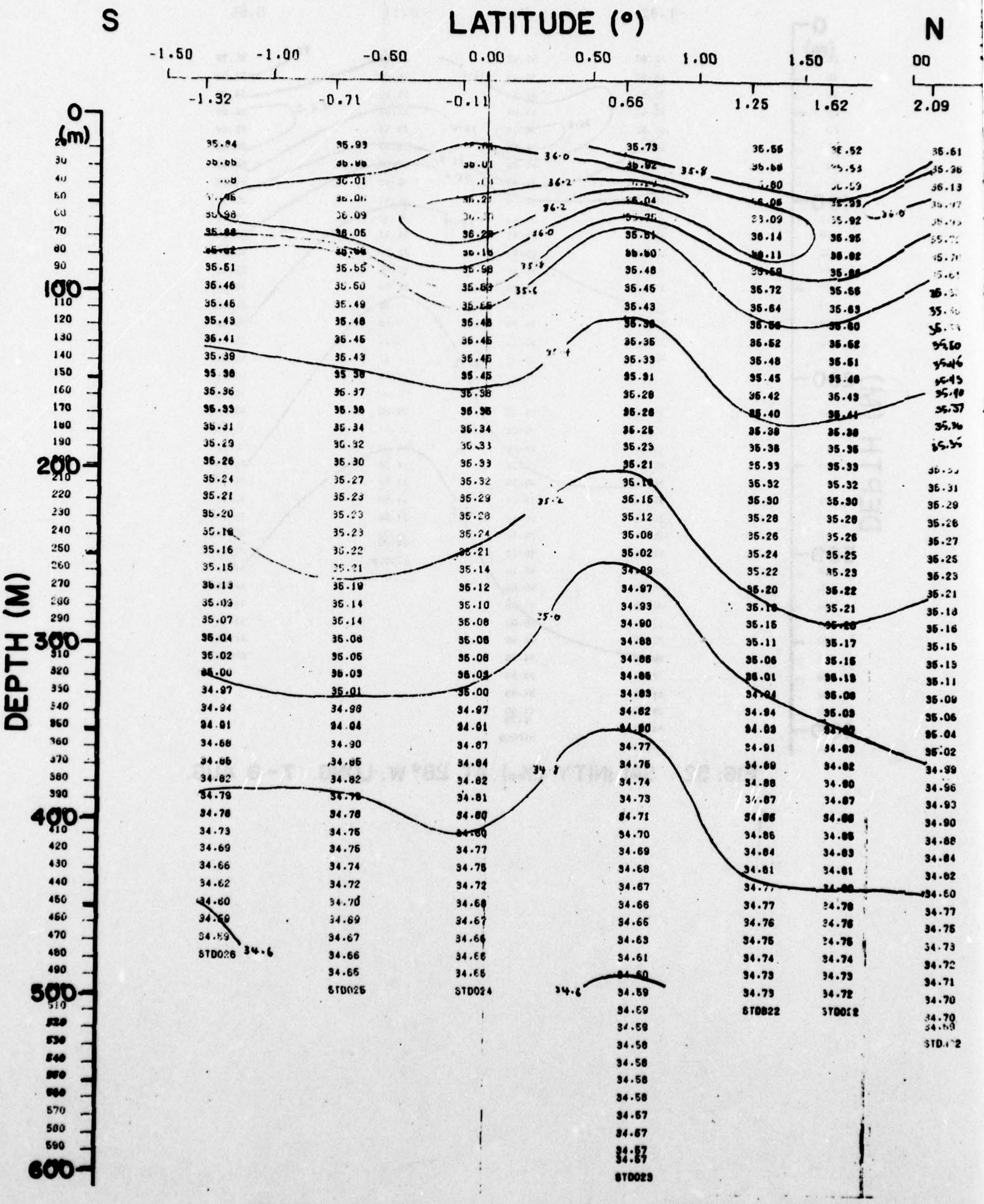


FIG. 51 SALINITY (‰) AT 28° W. LONG. 4-6 AUG.

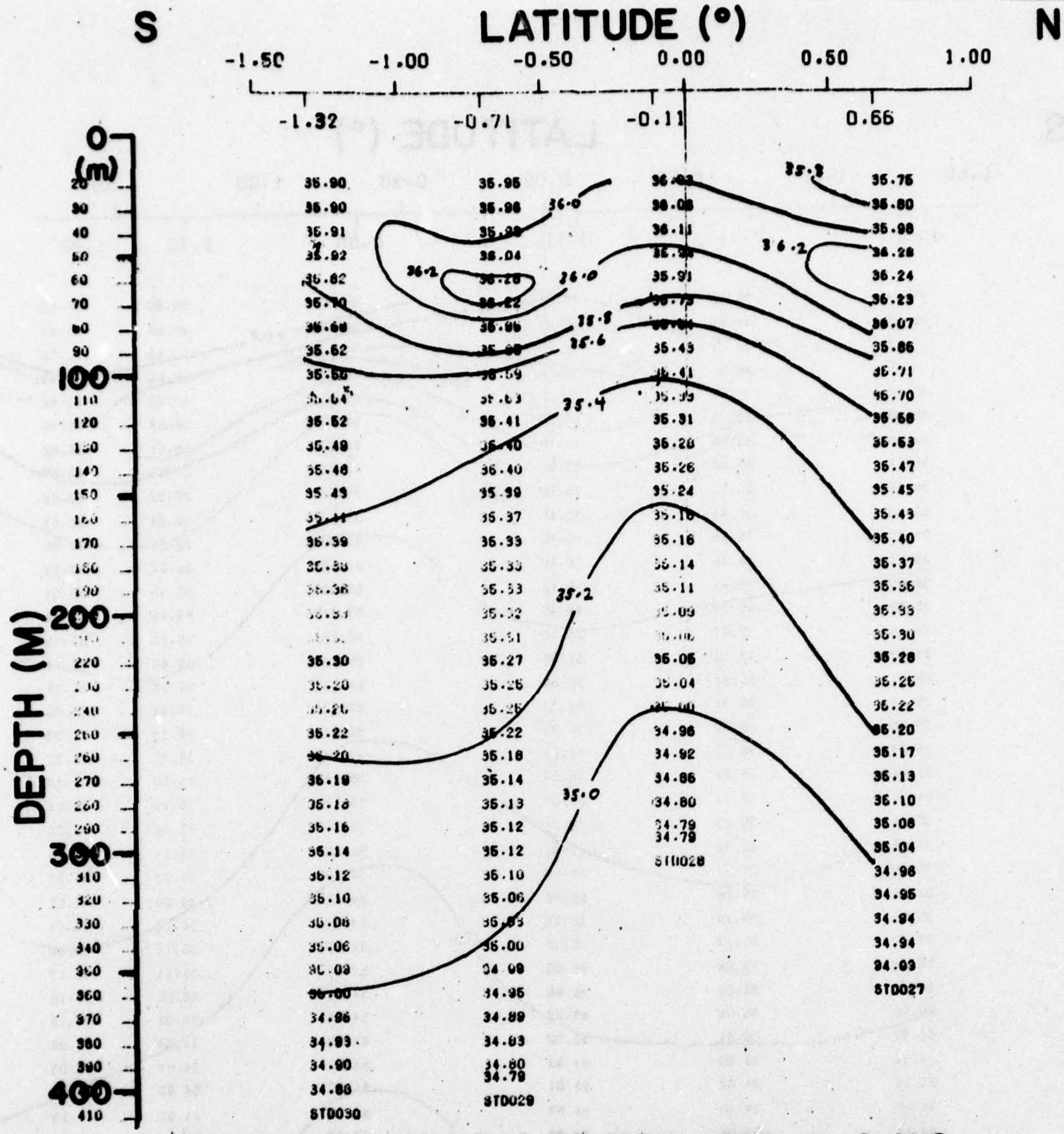


FIG. 52 SALINITY (‰) AT 28° W. LONG. 7-8 AUG.

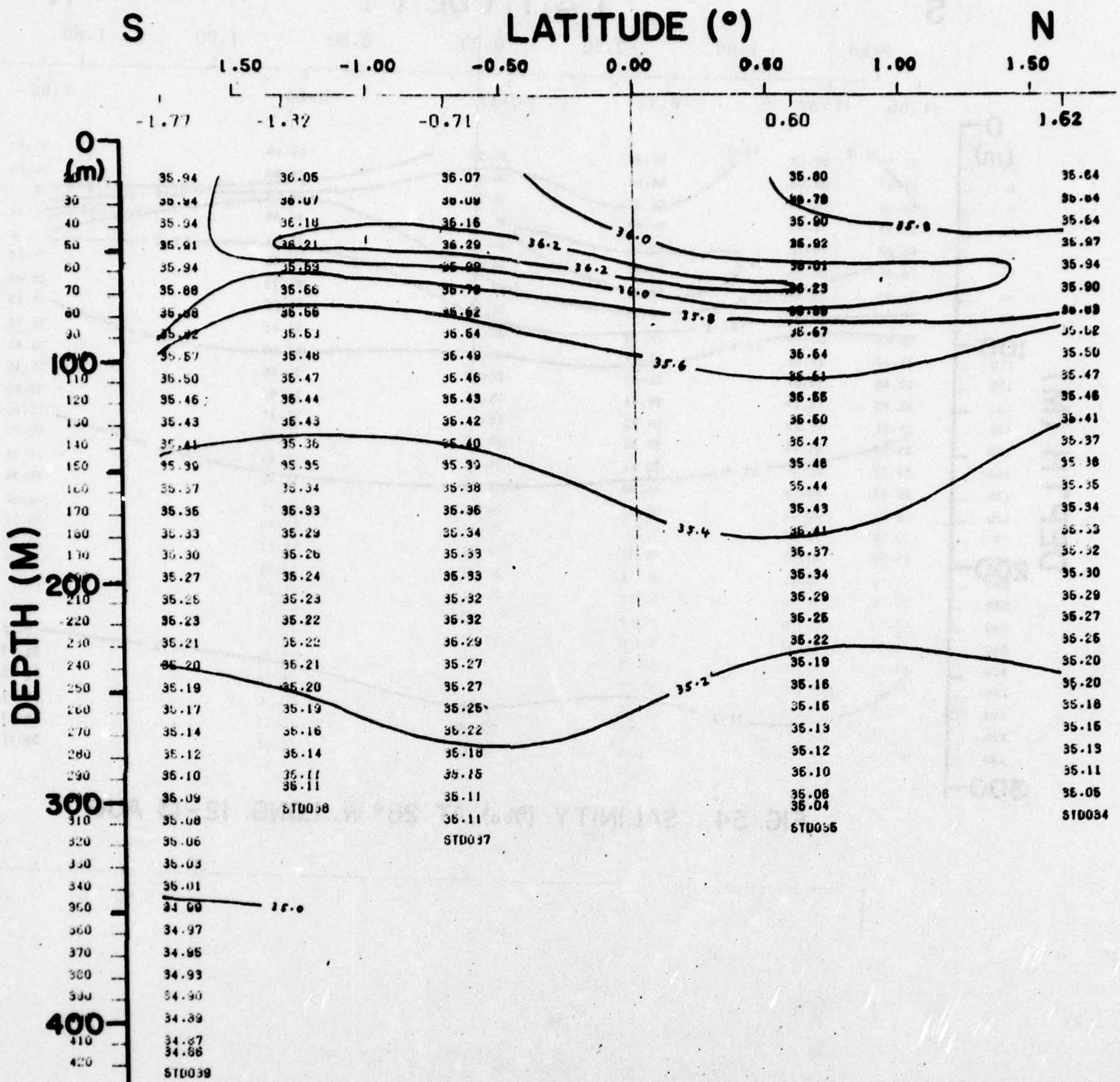


FIG. 53 SALINITY (‰) AT 28° W. LONG. 9-10 AUG.

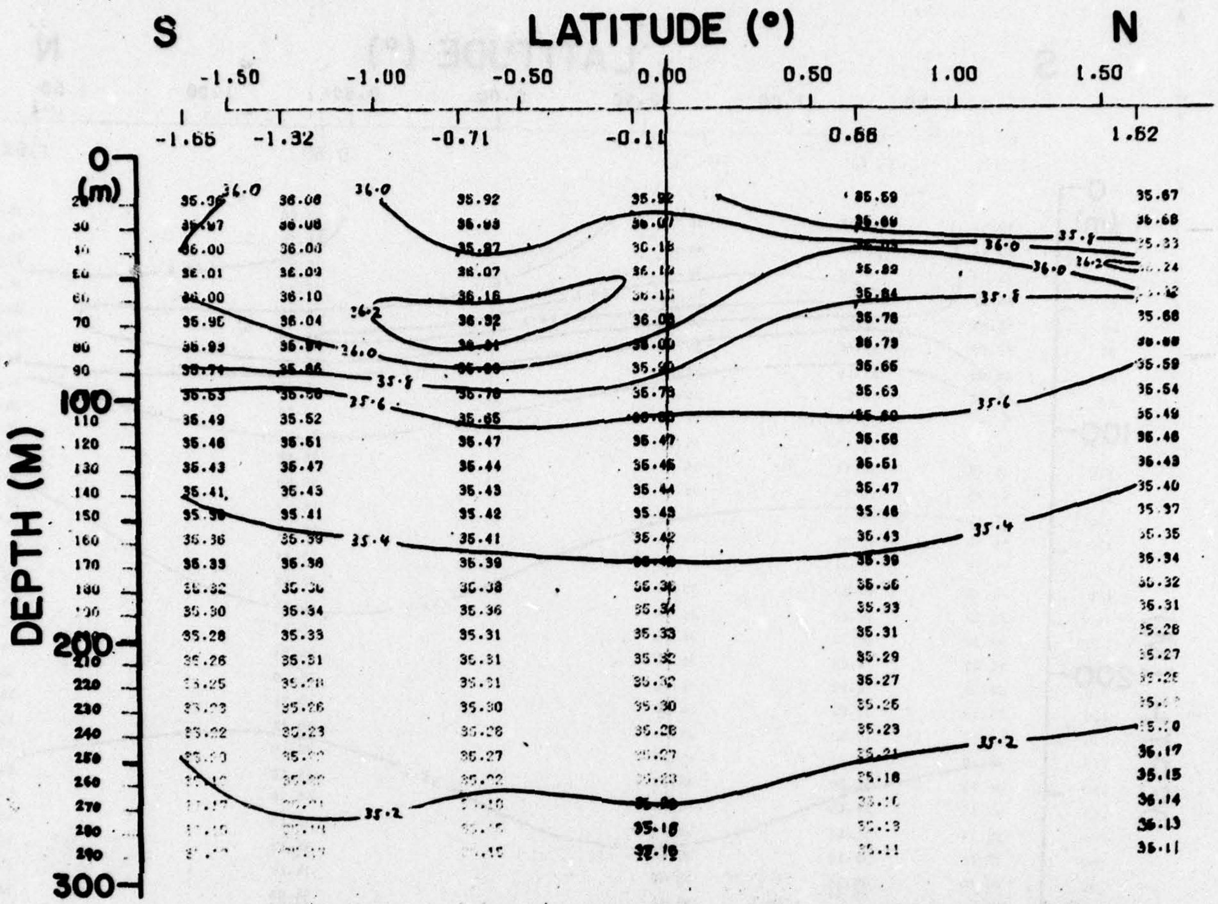


FIG. 54 SALINITY (‰) AT 28° W. LONG. 12-13 AUG.

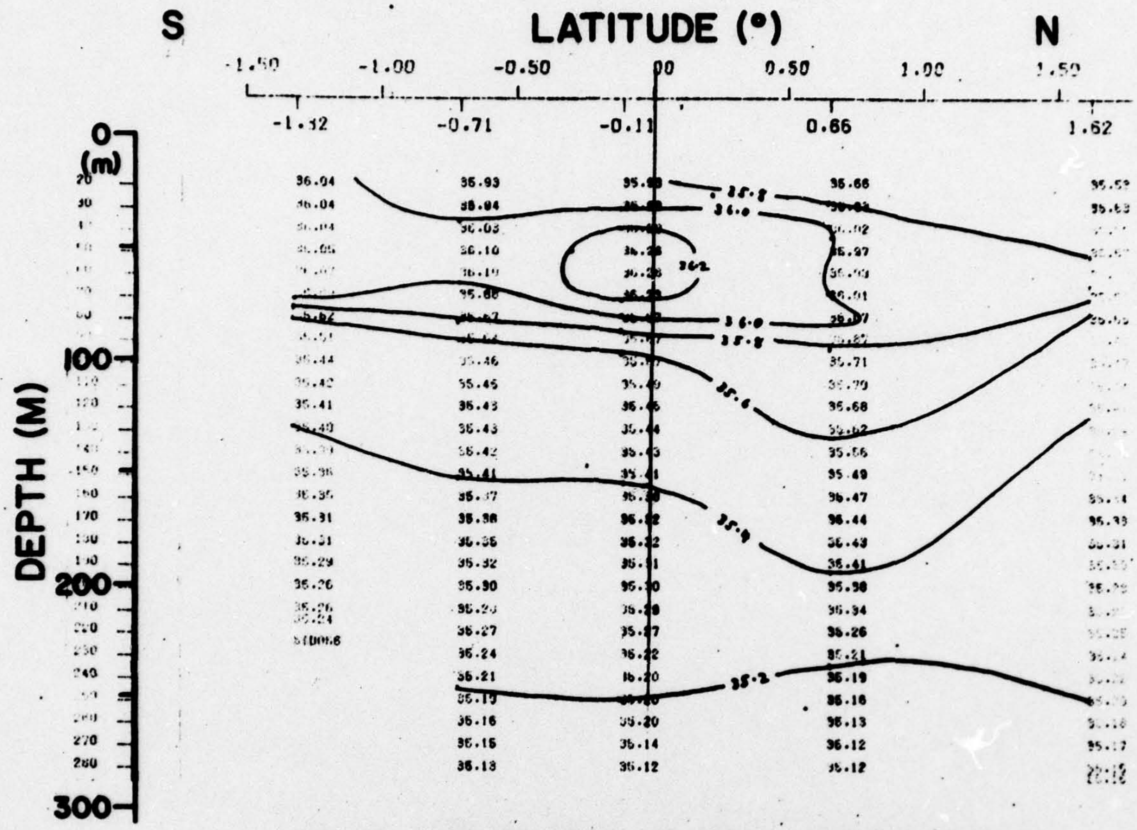


FIG. 55 SALINITY (‰) AT 28° W. LONG. 15-16 AUG.

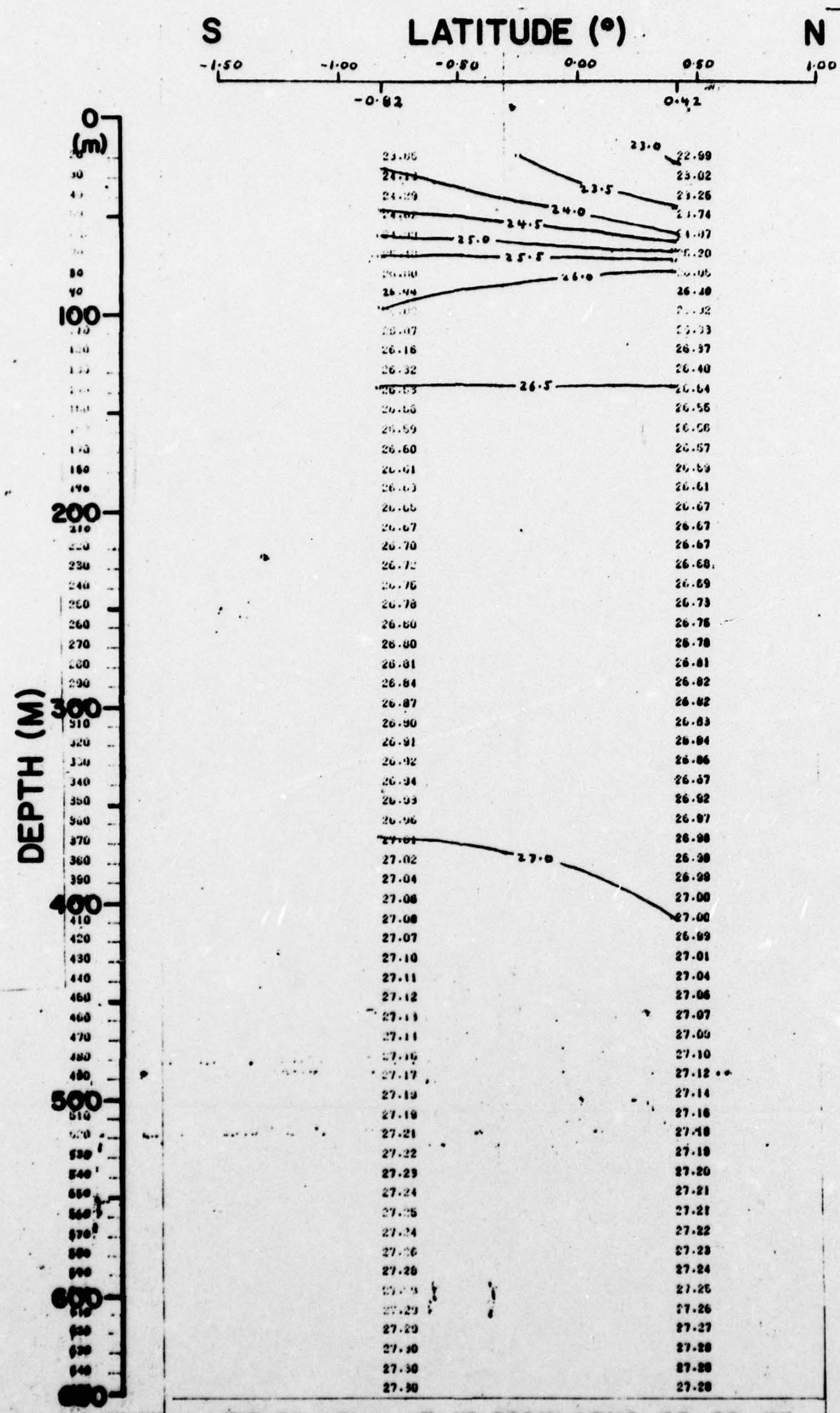


FIG. 56 Sigma-T AT 29° W. LONG. 28-29 JUL.

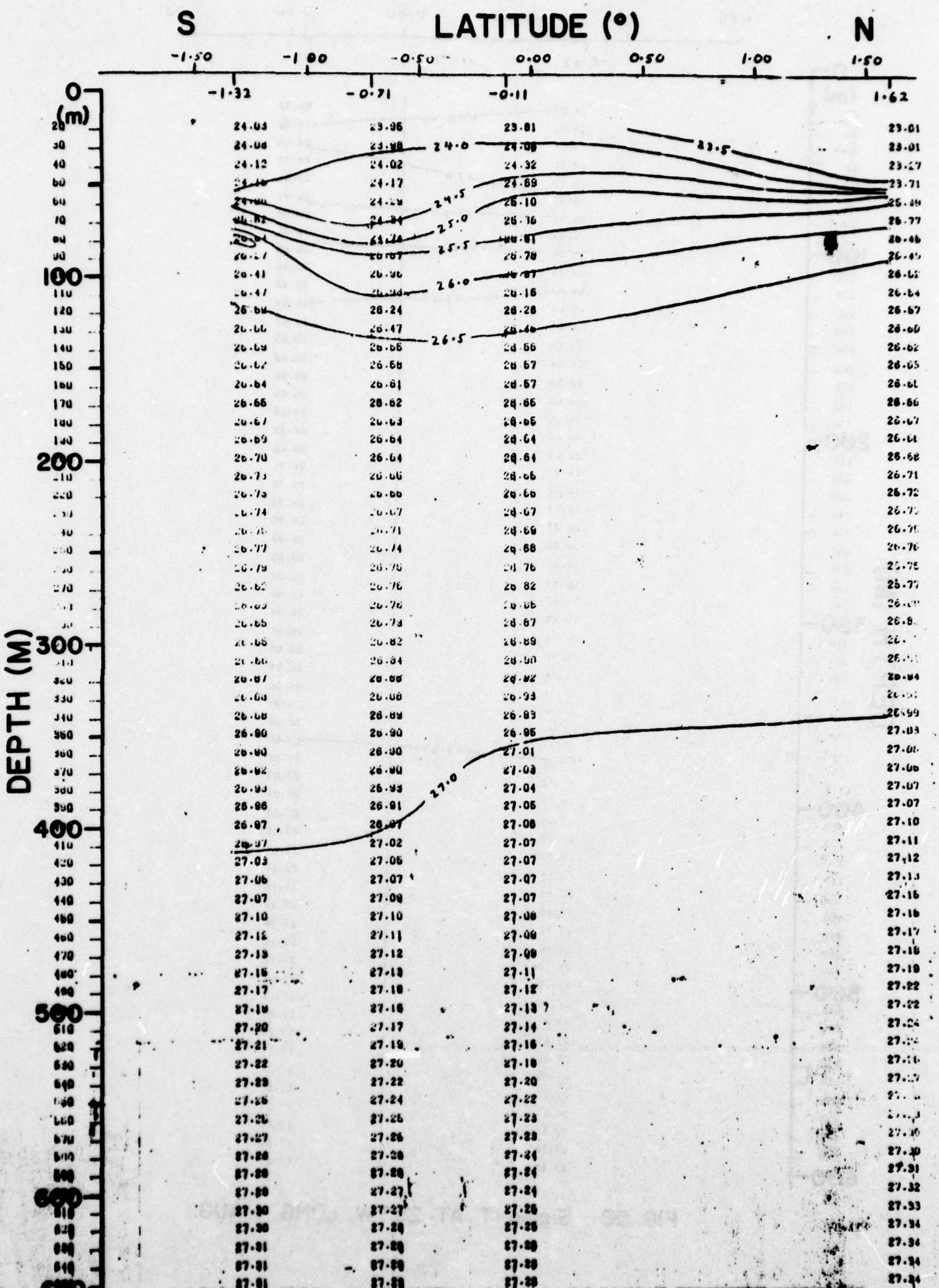


FIG. 57 Sigma-T AT 28° W. LONG. 30 JUL.–1 AUG.

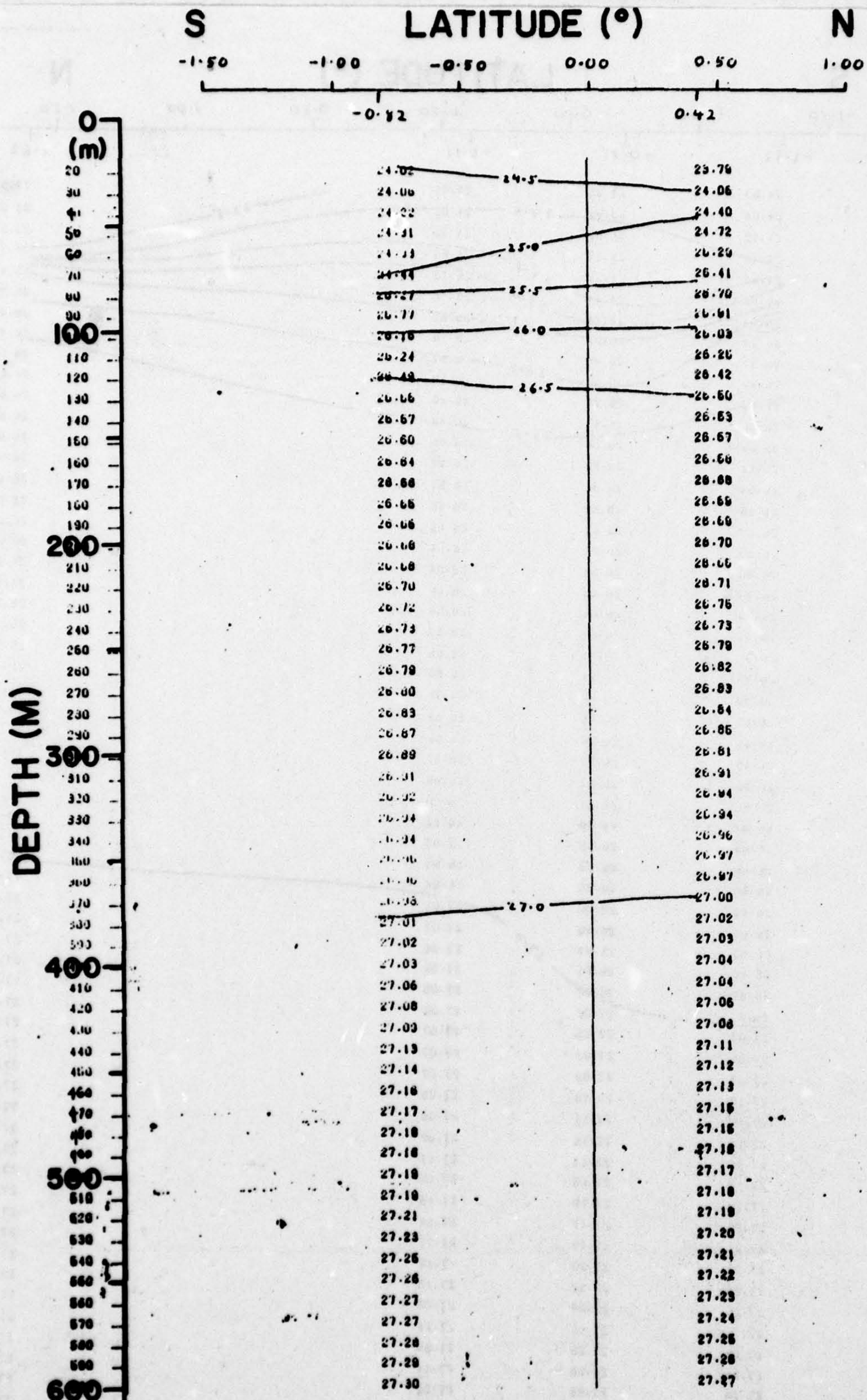


FIG. 58 Sigma-T AT 29° W. LONG. 1 AUG.

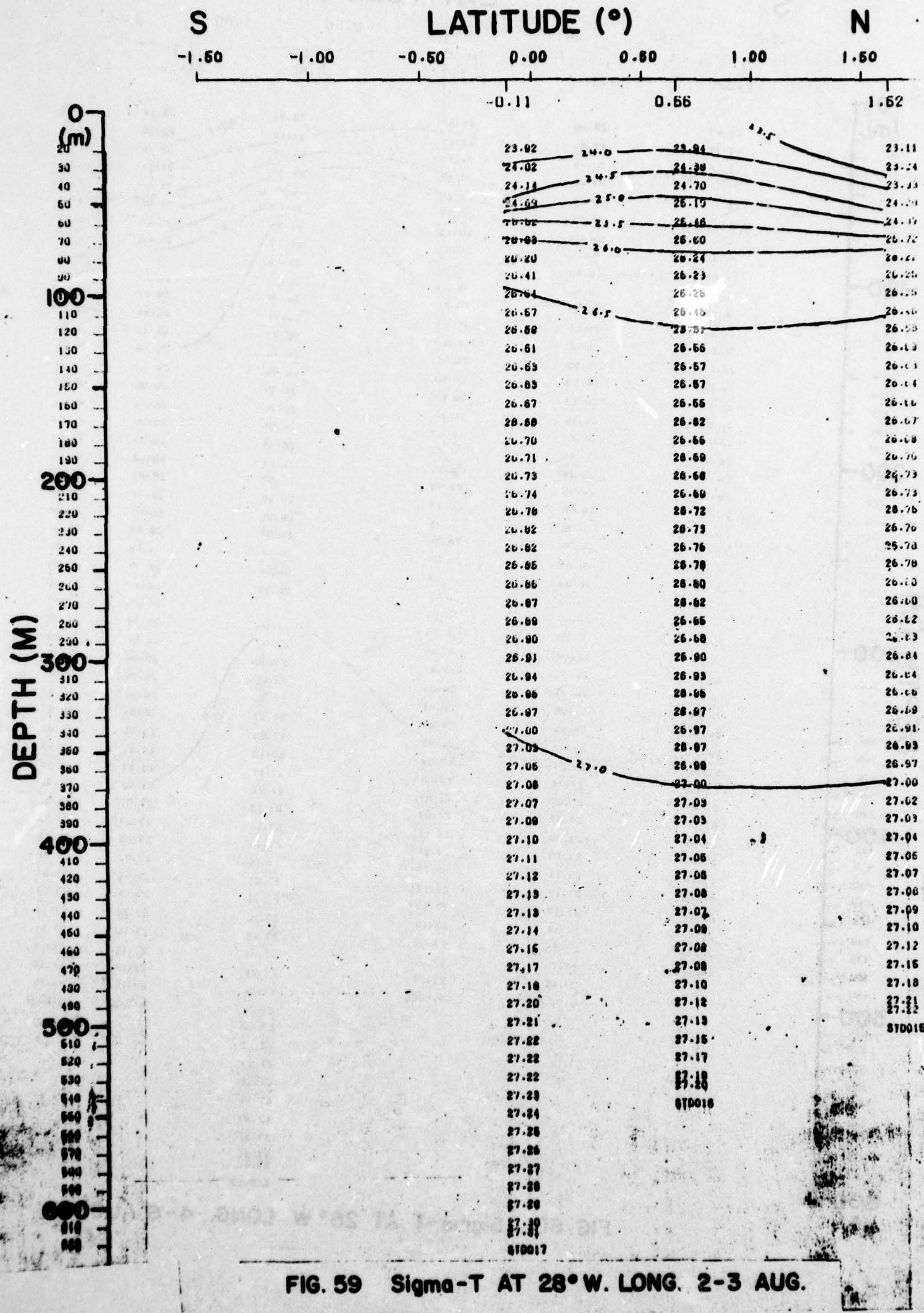


FIG. 59 Sigma-T AT 28° W. LONG. 2-3 AUG.

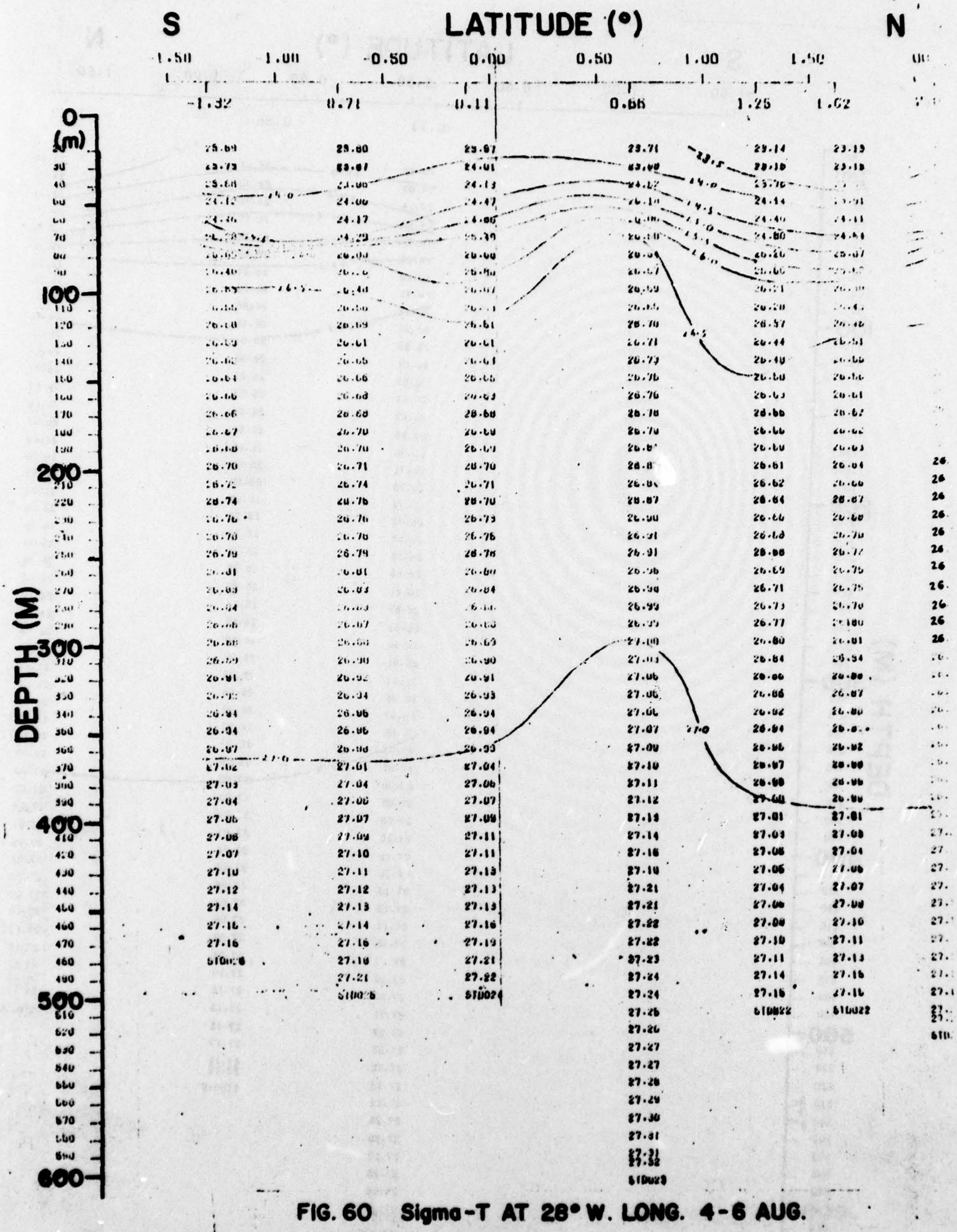


FIG. 60 Sigma-T AT 28° W. LONG. 4-6 AUG.

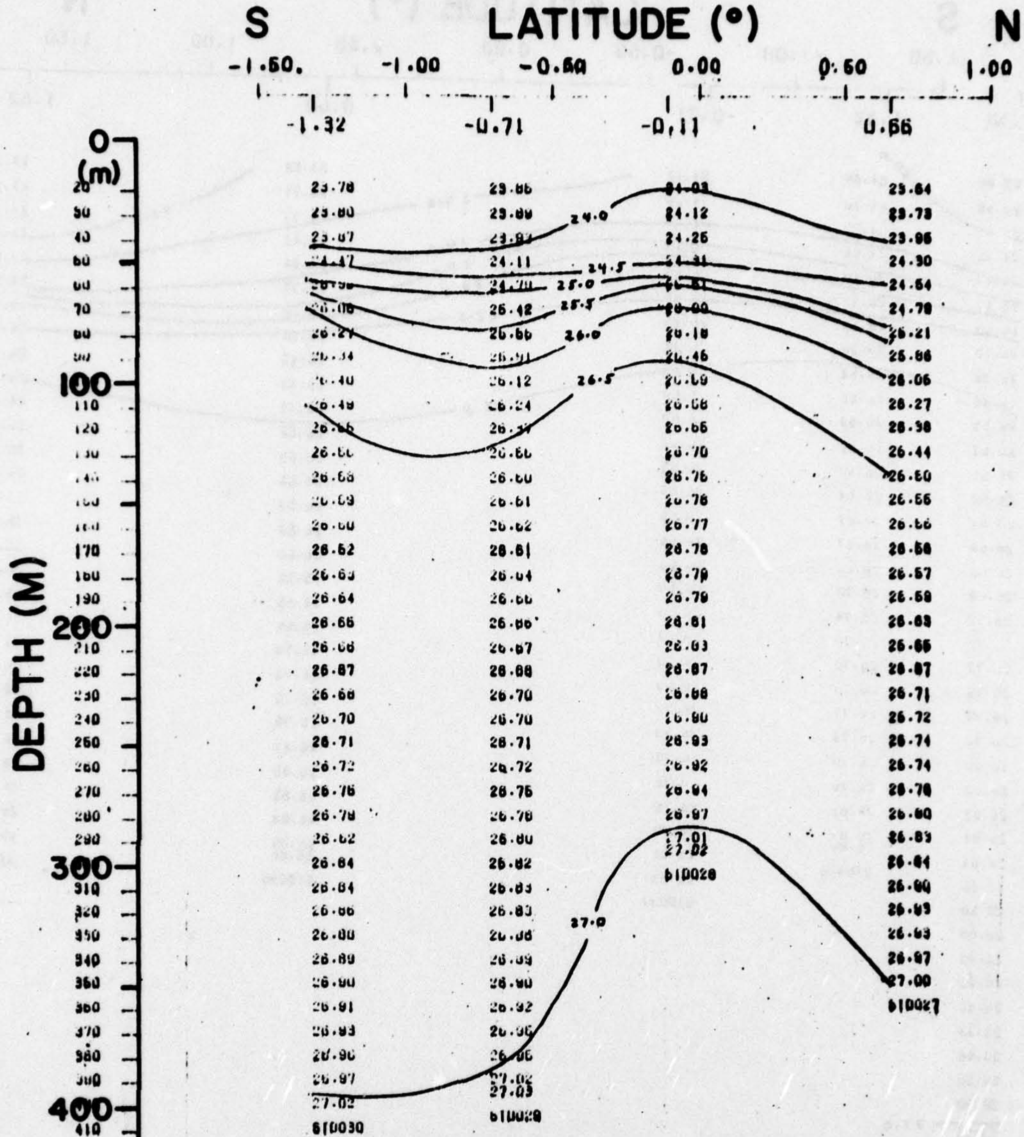


FIG. 61 Sigma-T AT 28° W. LONG. 7-8 AUG.

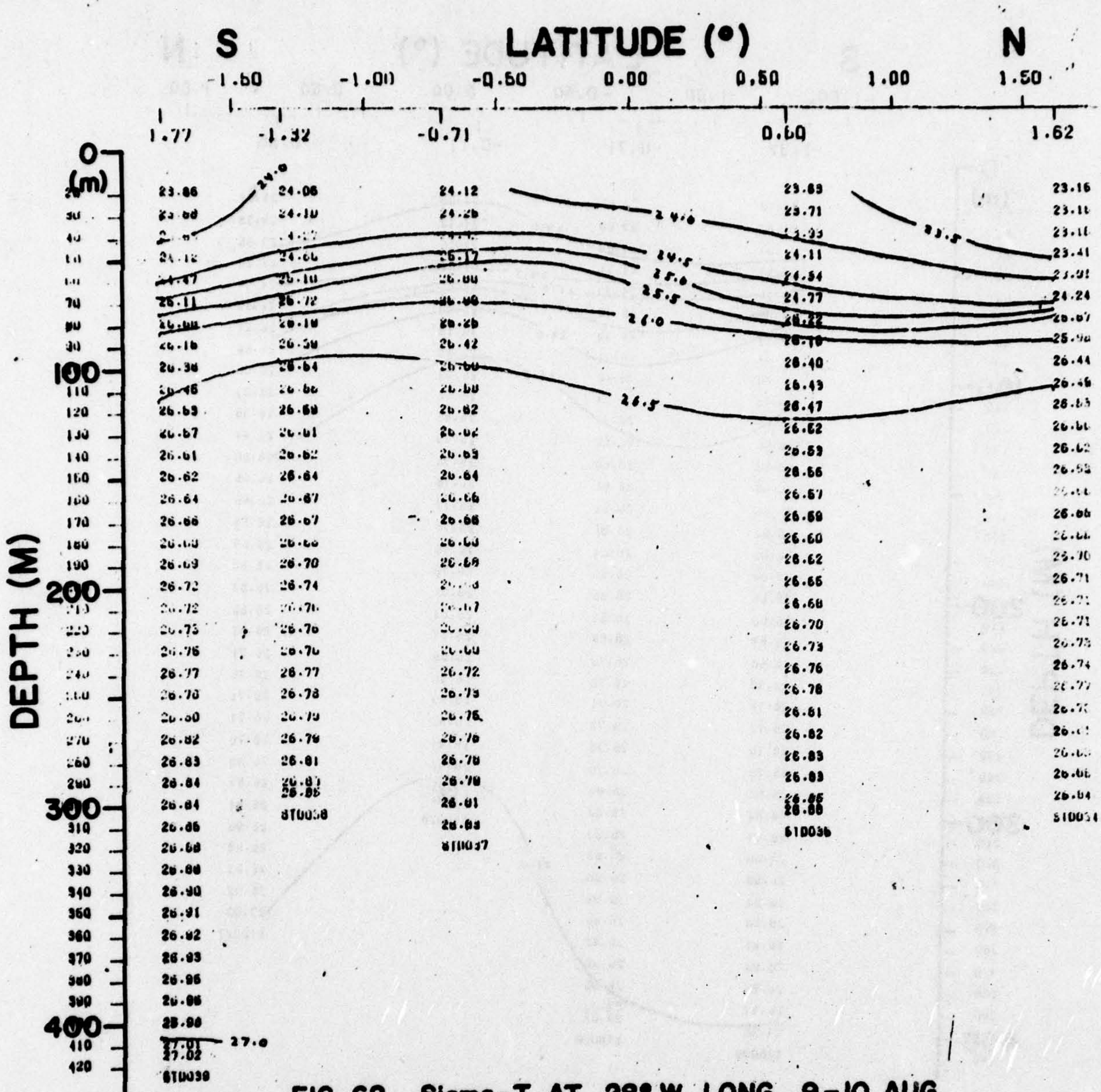


FIG. 62 Sigma-T AT 28° W. LONG. 9-10 AUG.

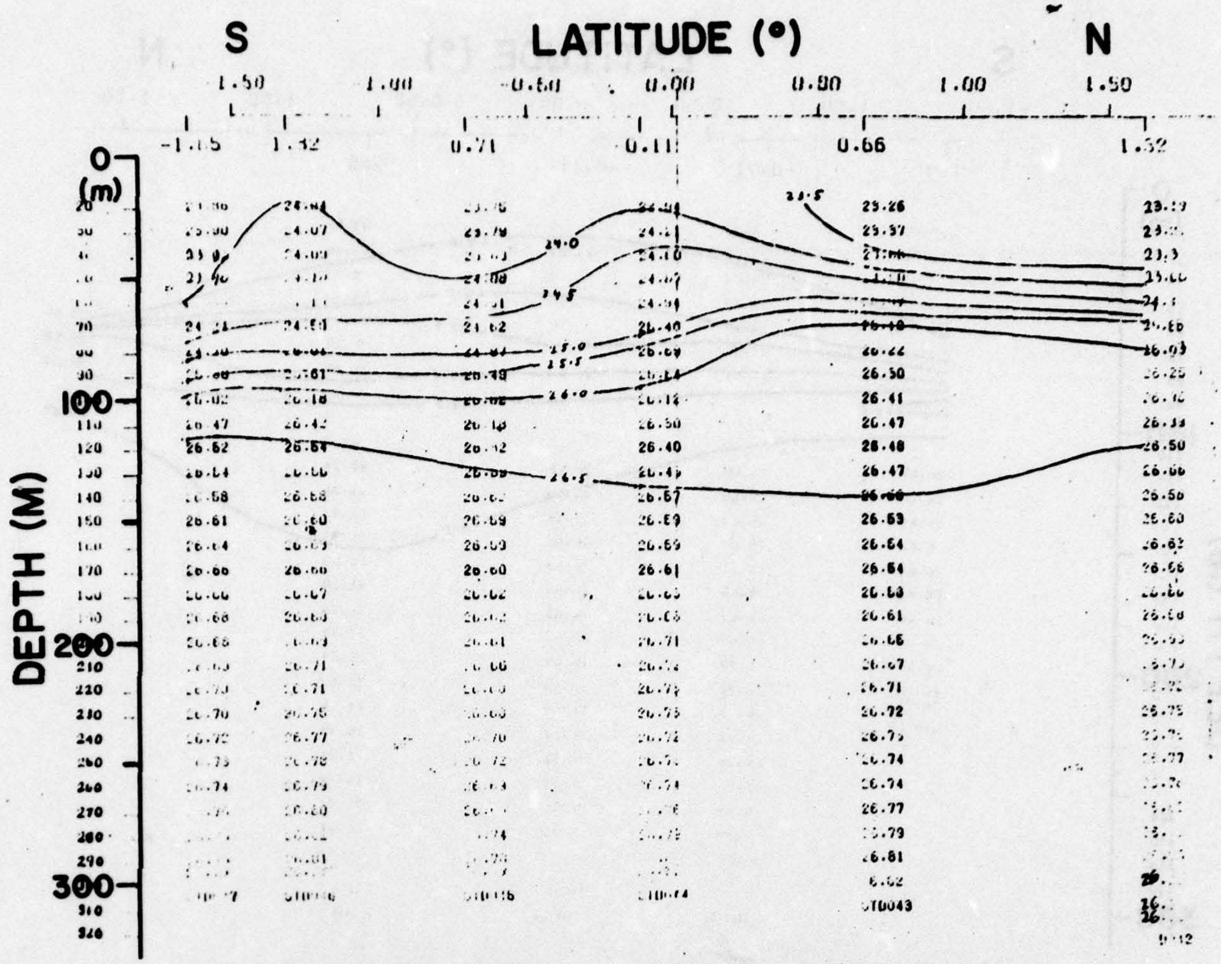


FIG. 63 Sigma-T AT 28° W. LONG. 12-13 AUG.

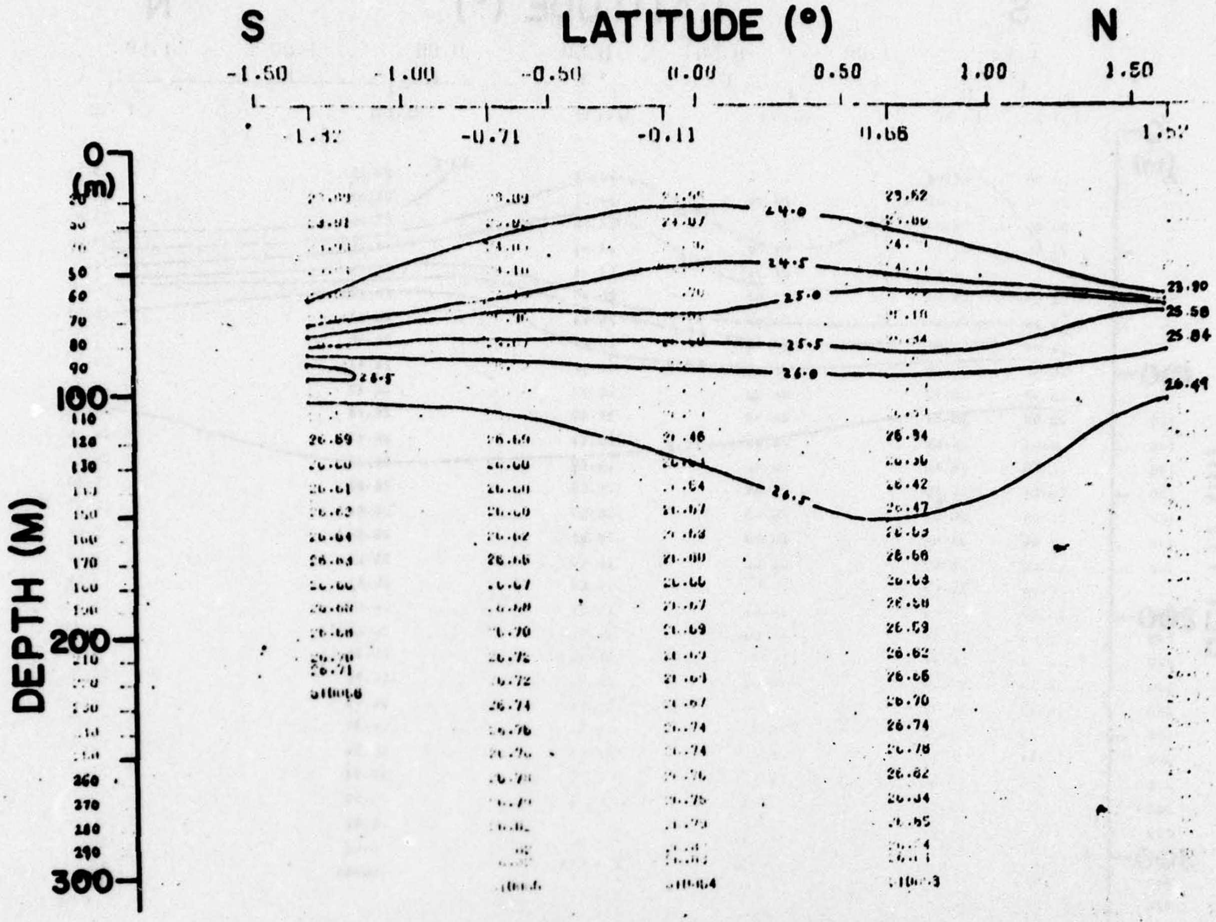


FIG. 64 Sigma-T AT 28° W. LONG. 15-16 AUG.

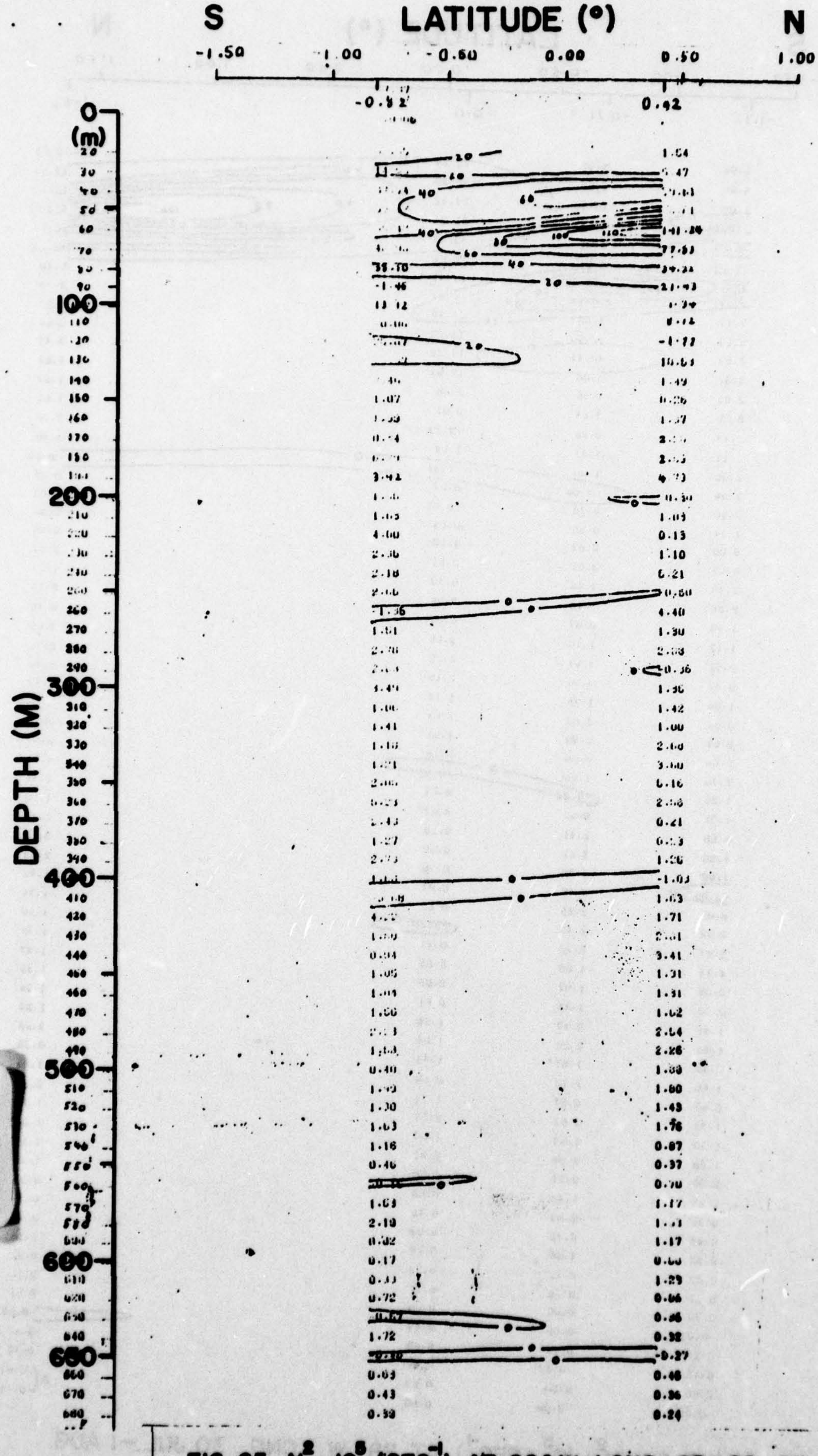


FIG. 65 $N^2 \times 10^5$ (SEC^{-1}) AT 29° W. LONG 28-29 JUL.

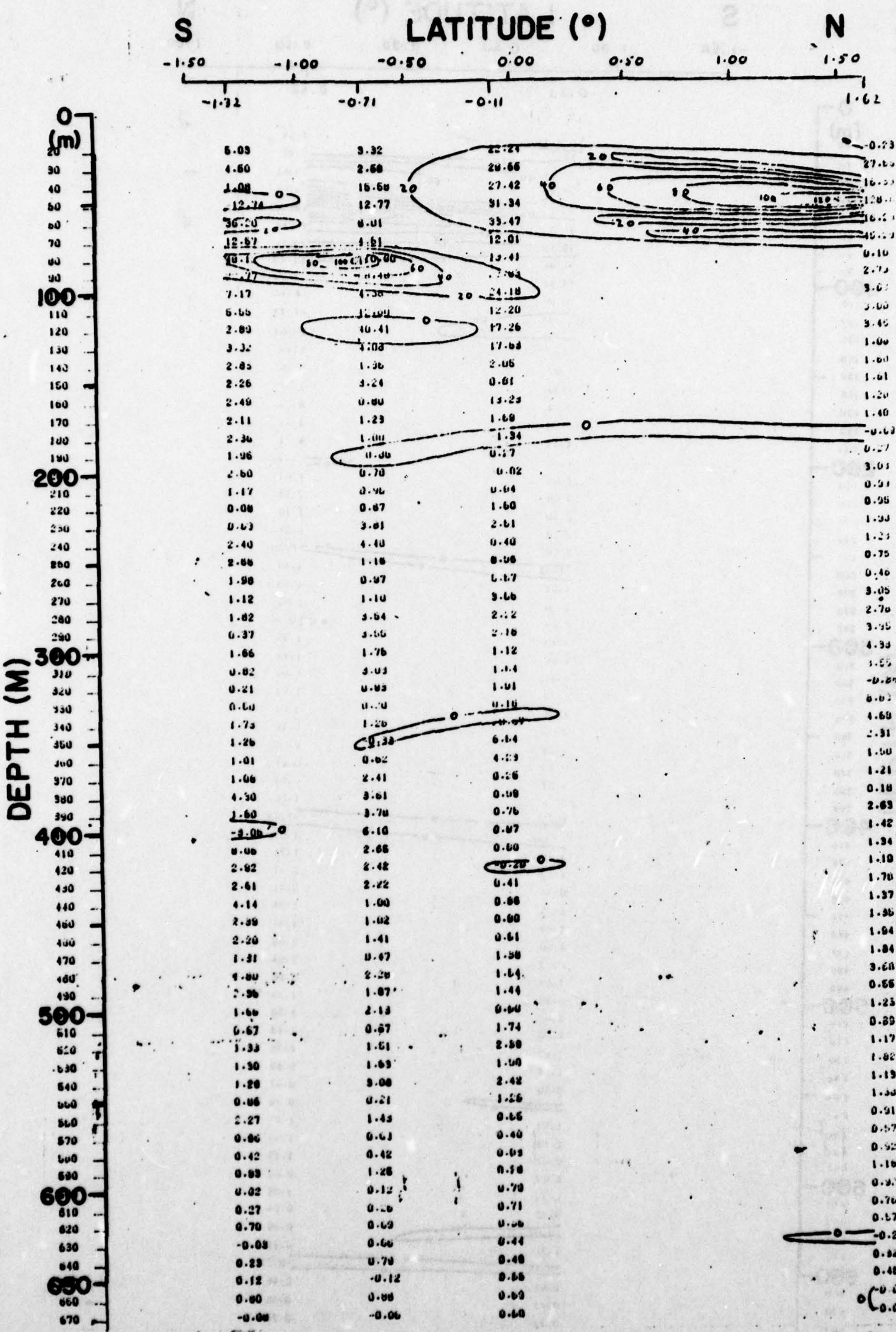


FIG. 66 $N^2 \times 10^5$ (SEC^{-1}) AT 28° W. LONG. 30 JUL.-1 AUG.

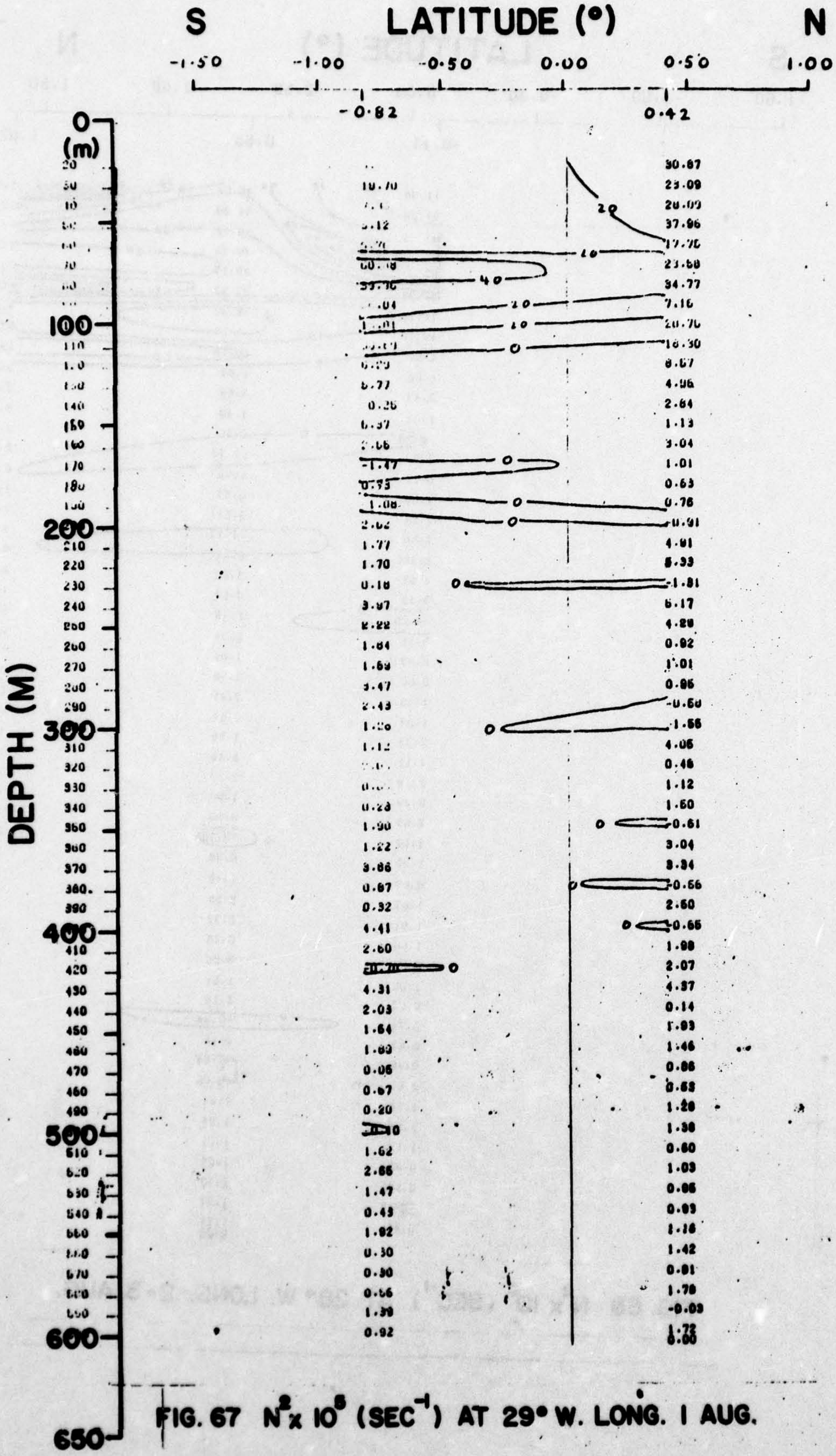


FIG. 67 $N^2 \times 10^5$ (SEC^{-1}) AT 29° W. LONG. 1 AUG.

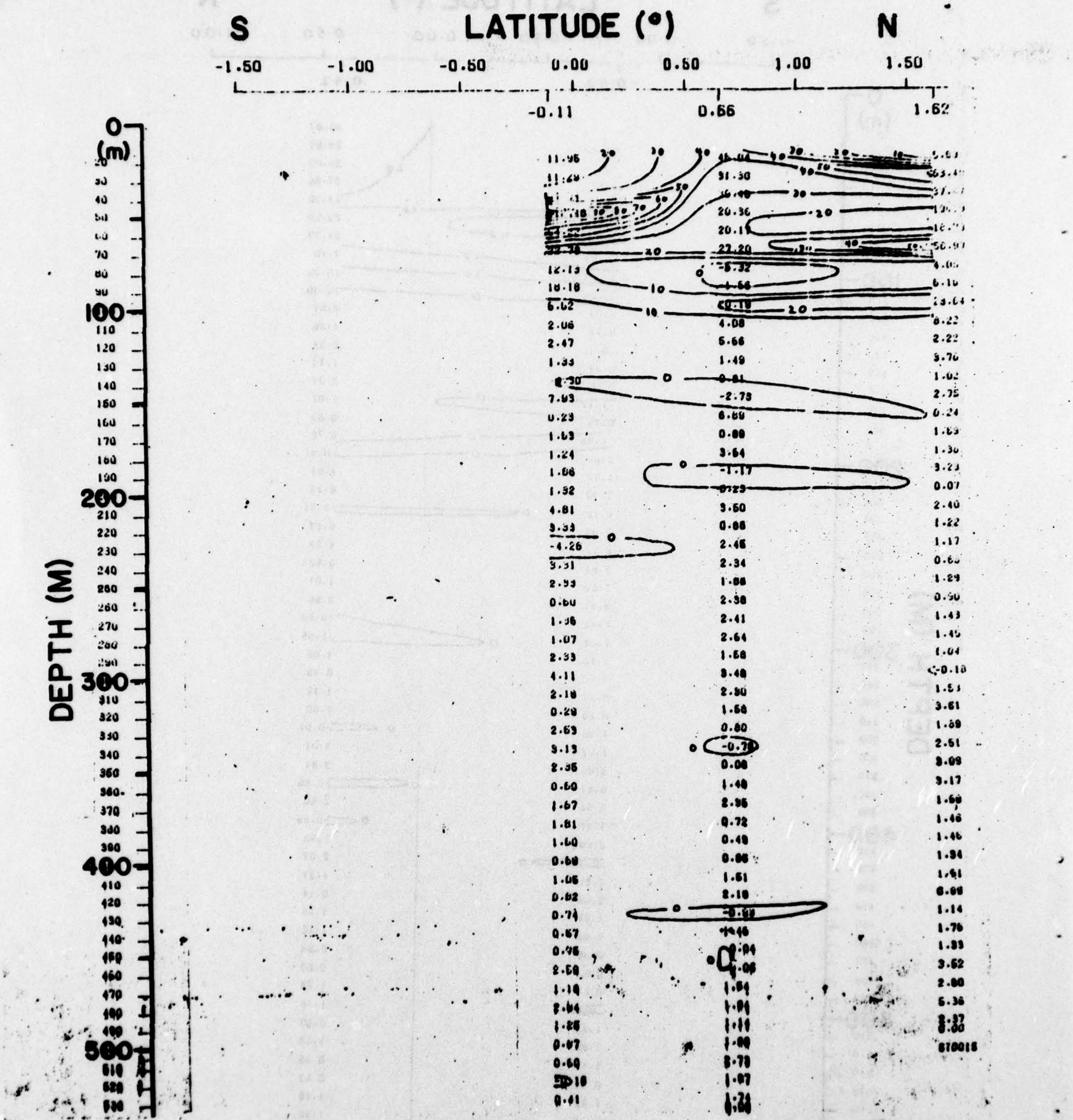


FIG. 68 $N^2 \times 10^5$ (SEC^{-1}) AT 28° W. LONG. 2-3 AUG.

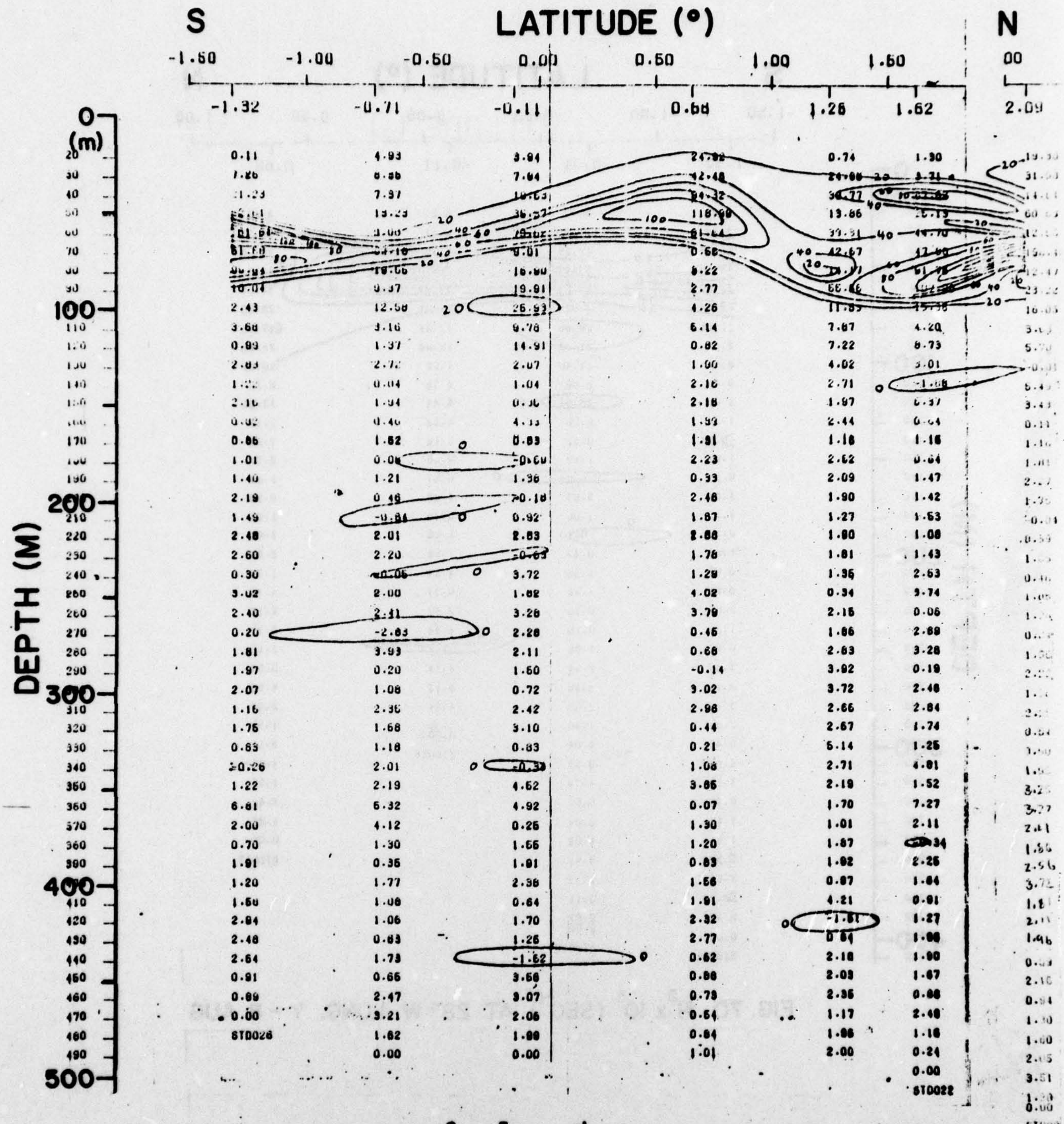


FIG. 69 $N^2 \times 10^5$ (SEC^{-1}) AT 28° W. LONG. 4-6 AUG.

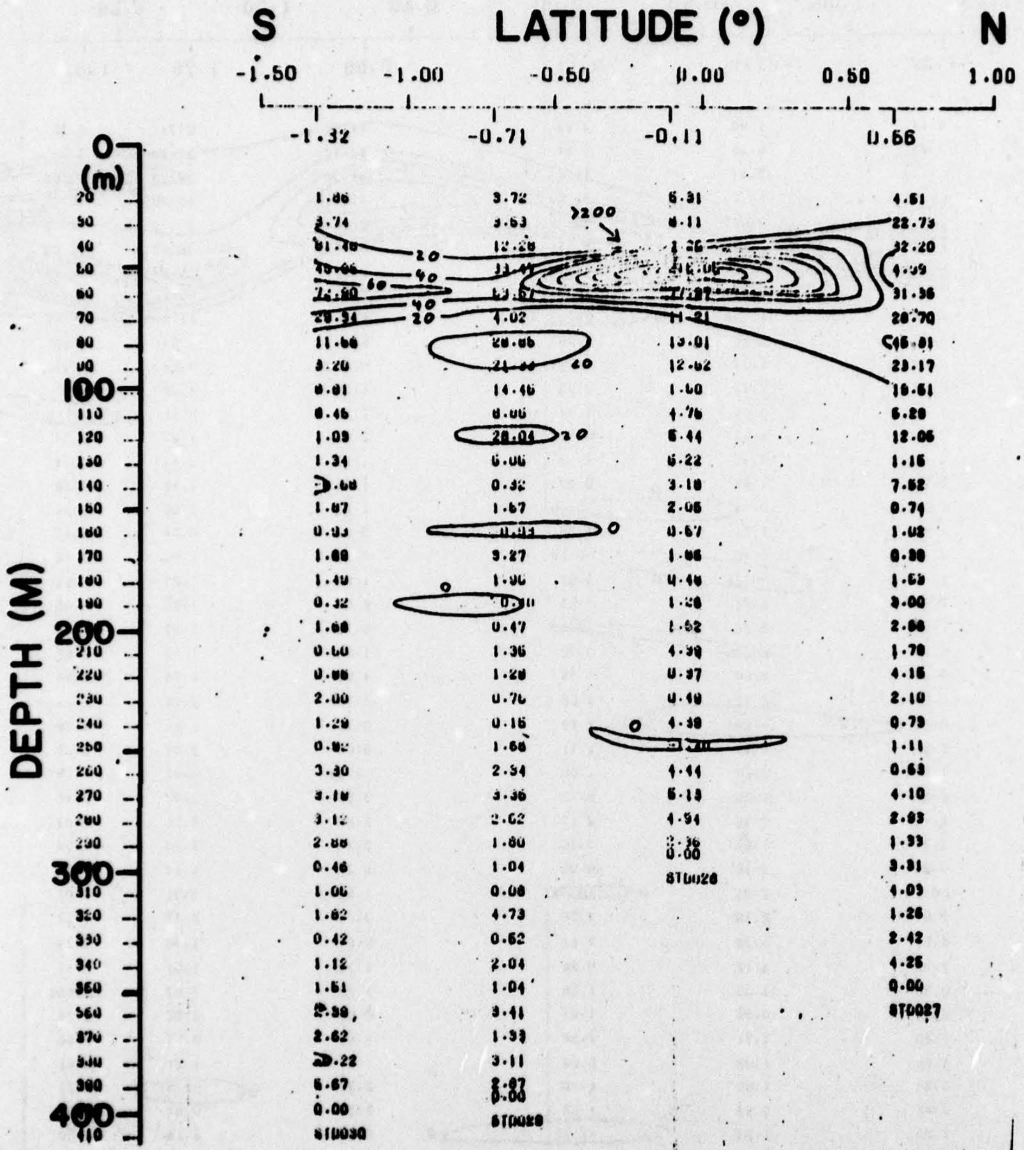


FIG. 70 $N^2 \times 10^5$ (SEC^{-1}) AT 28° W. LONG. 7 - 8 AUG

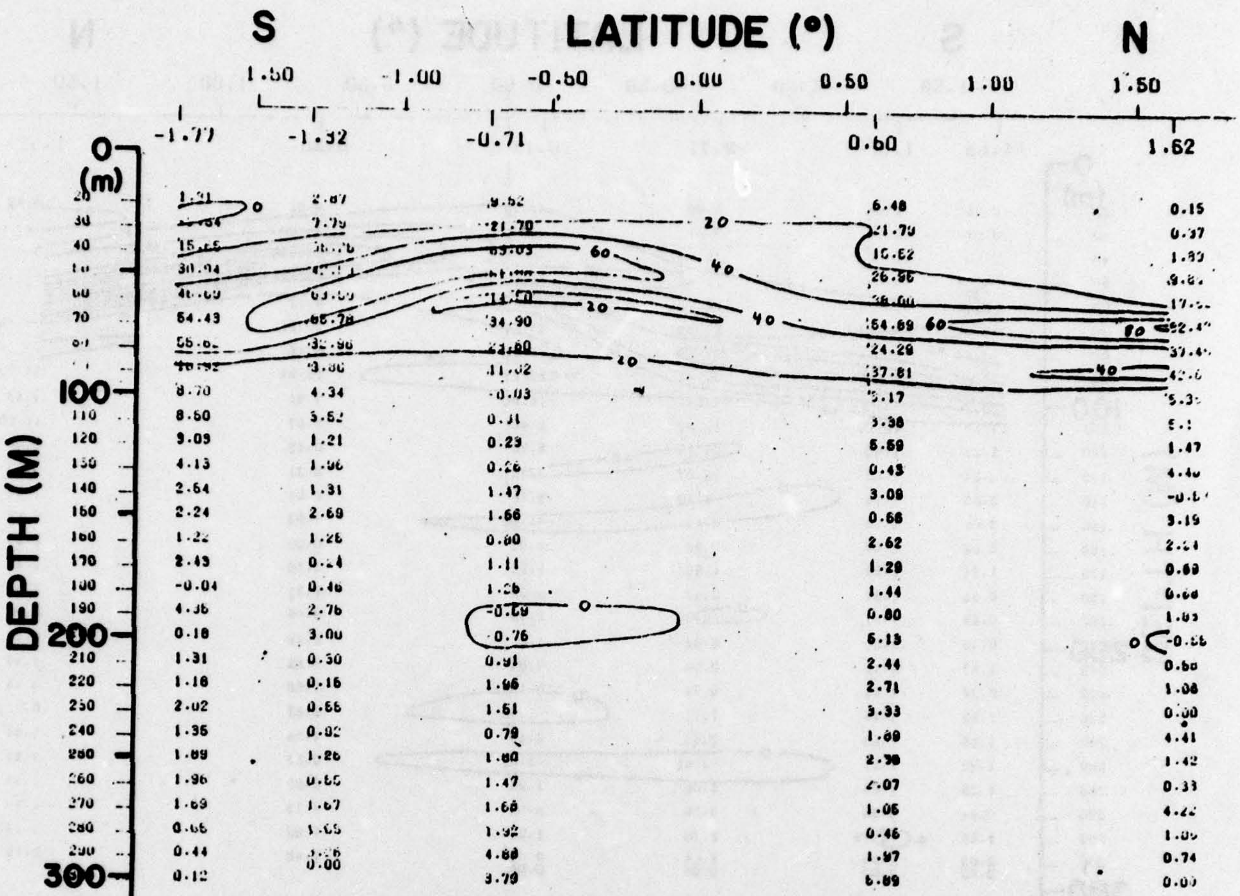


FIG. 71 $N^2 \times 10^5$ (SEC^{-1}) AT 28° W. LONG. 9-10 AUG.

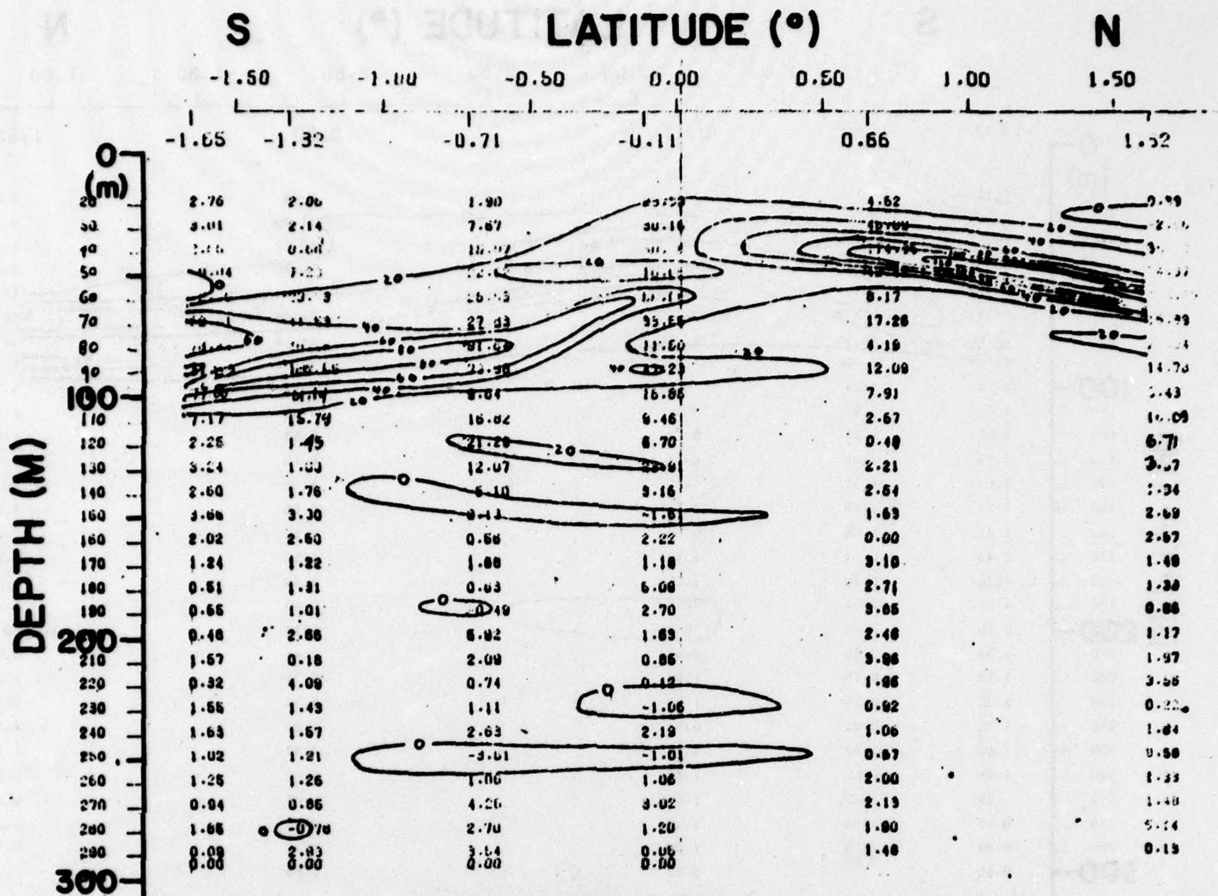


FIG. 72 $N^2 \times 10^5$ (SEC^{-1}) AT 28° W. LONG. 12-13 AUG.

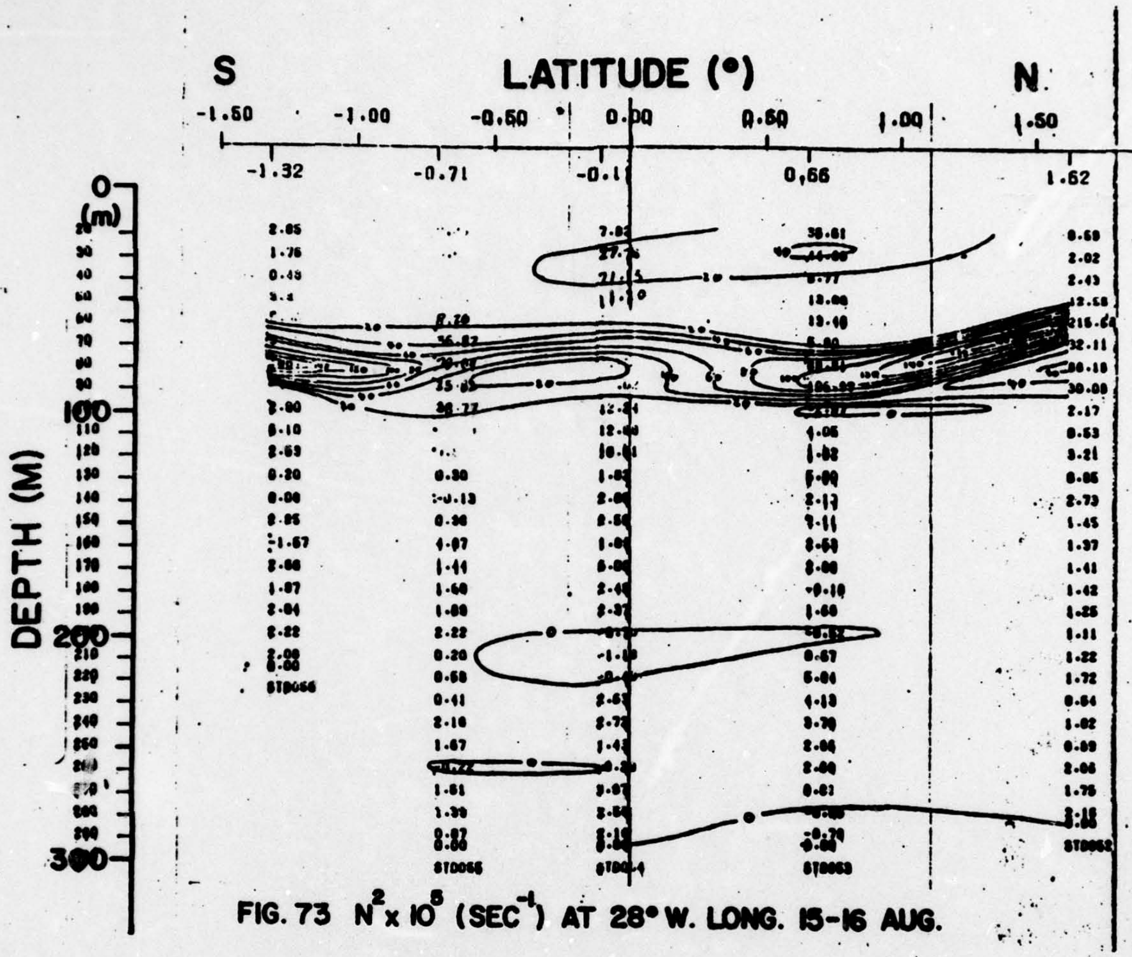


FIG. 73 $N^2 \times 10^5$ (SEC^{-1}) AT 28° W. LONG. 15-16 AUG.

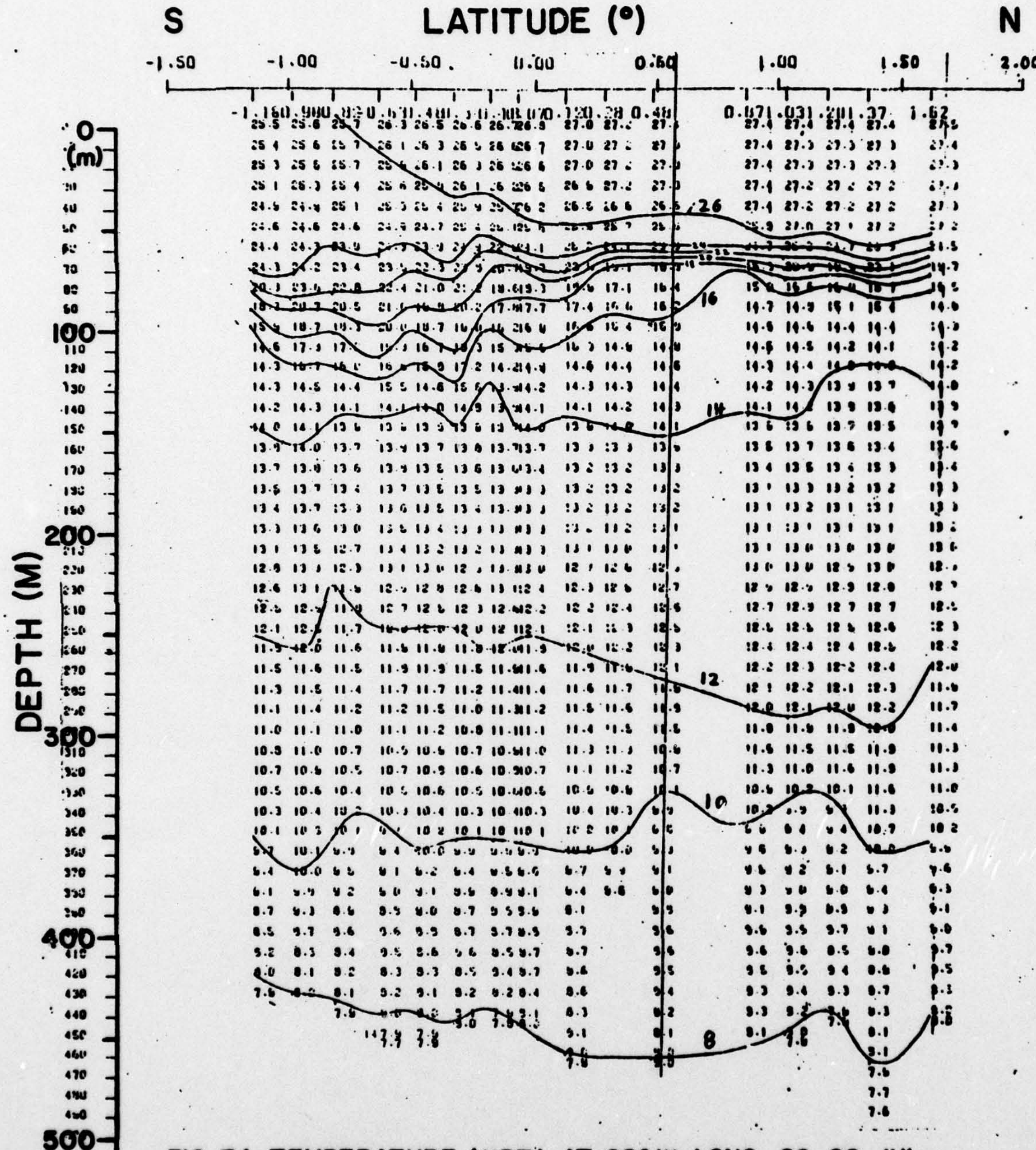


FIG. 74 TEMPERATURE (XBT) AT 28° W. LONG. 26-28 JUL.

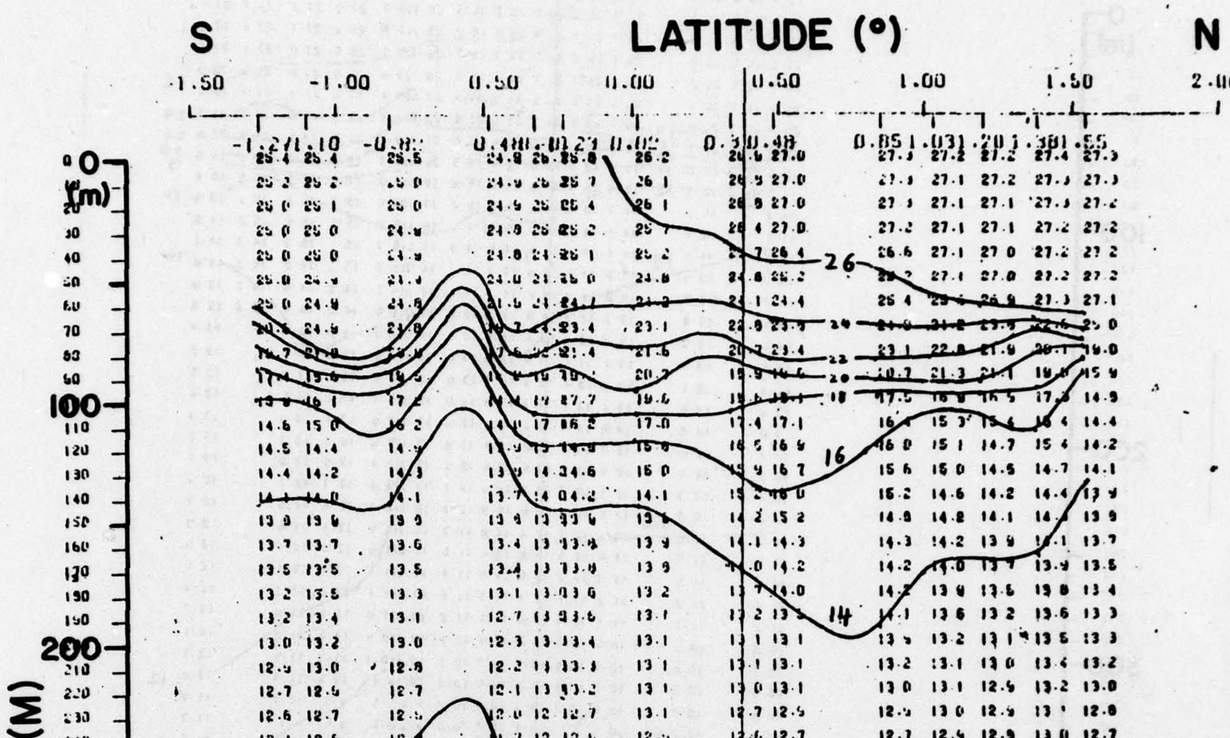


FIG. 75 TEMPERATURE (XBT) AT 28° W. LONG. 30 JUL.- 1 AUG.

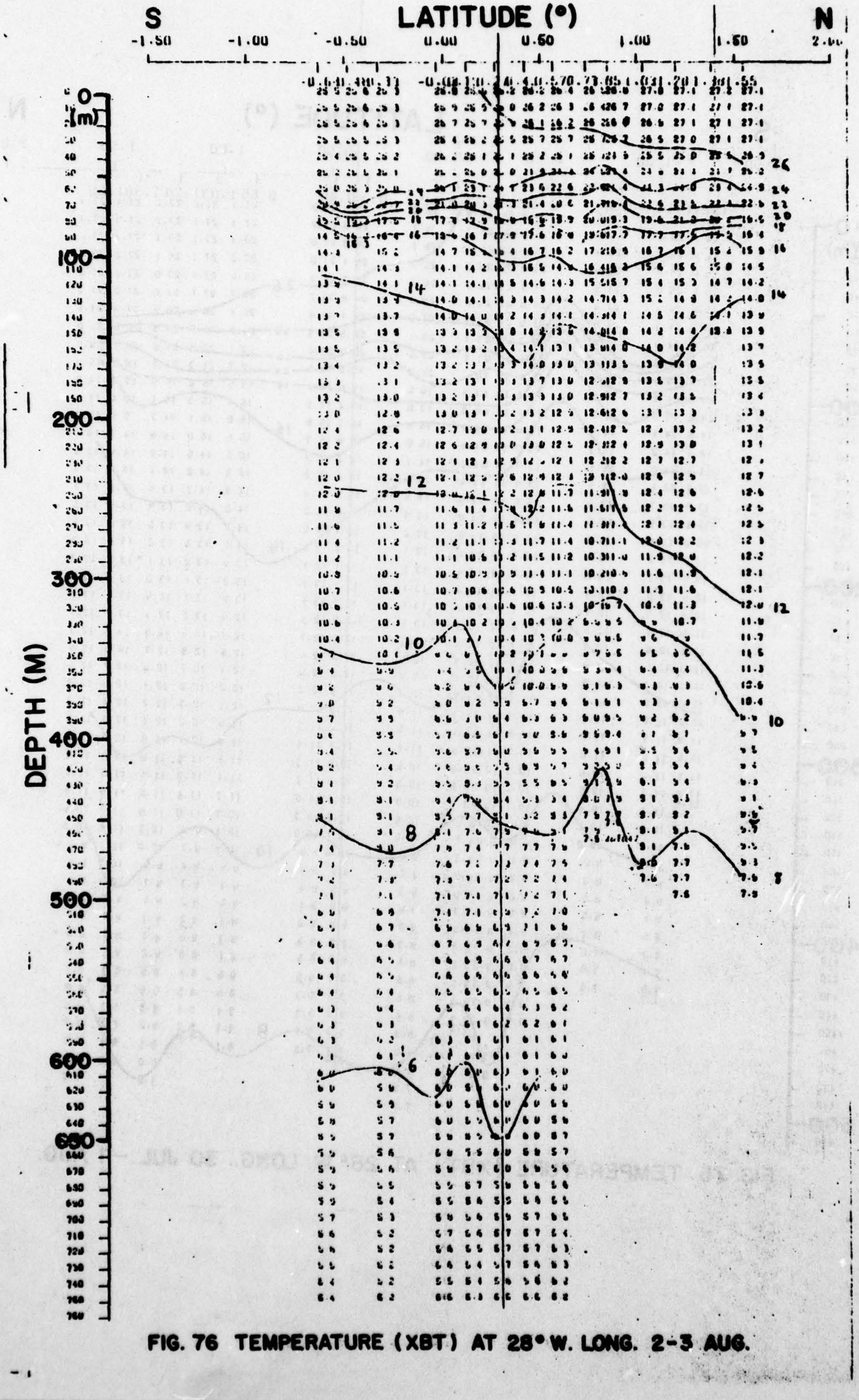


FIG. 76 TEMPERATURE (XBT) AT 28° W. LONG. 2-3 AUG.

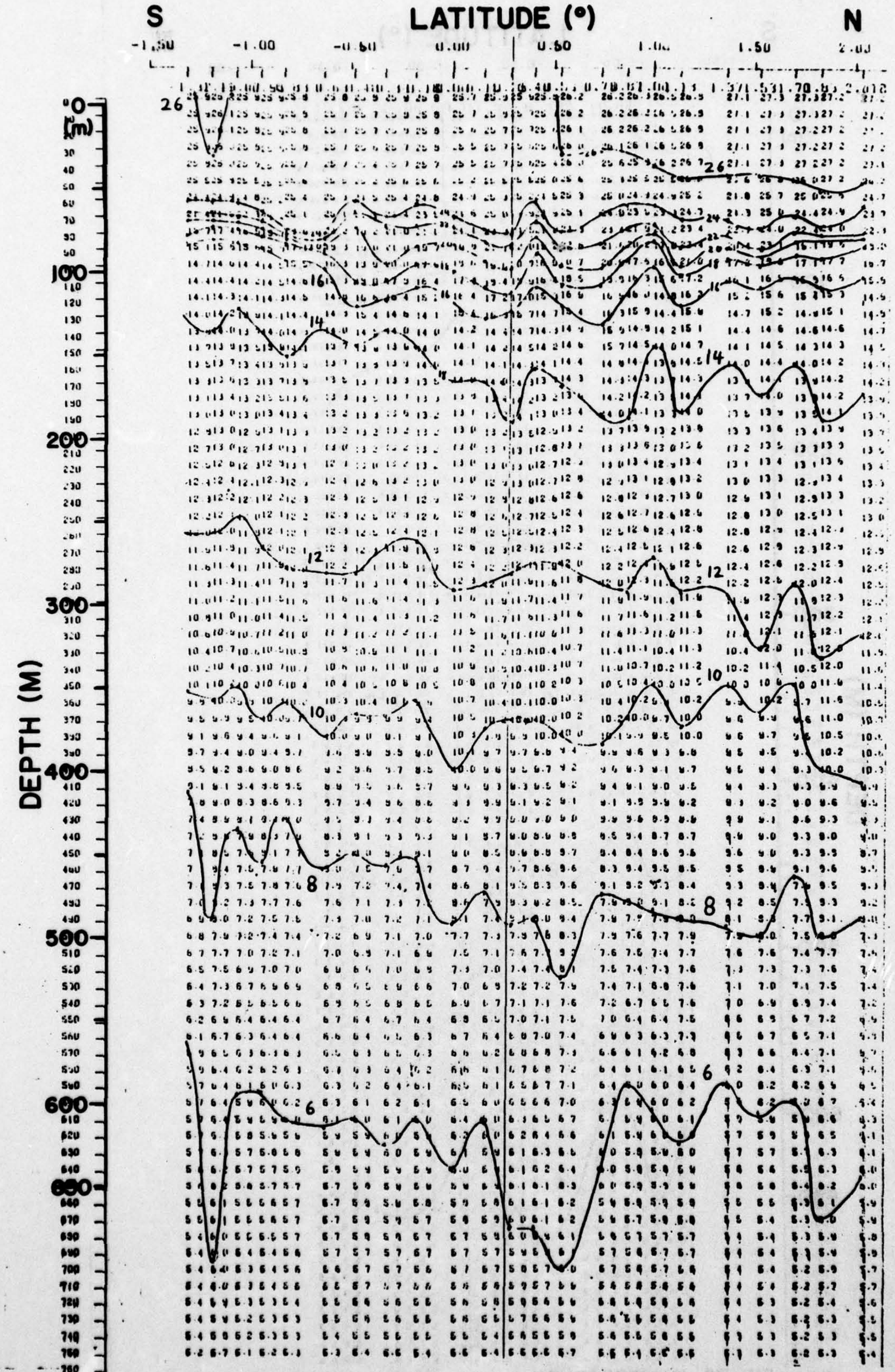


FIG. 77 TEMPERATURE (XBT) AT 28° W. LONG. 4-6 AUG.

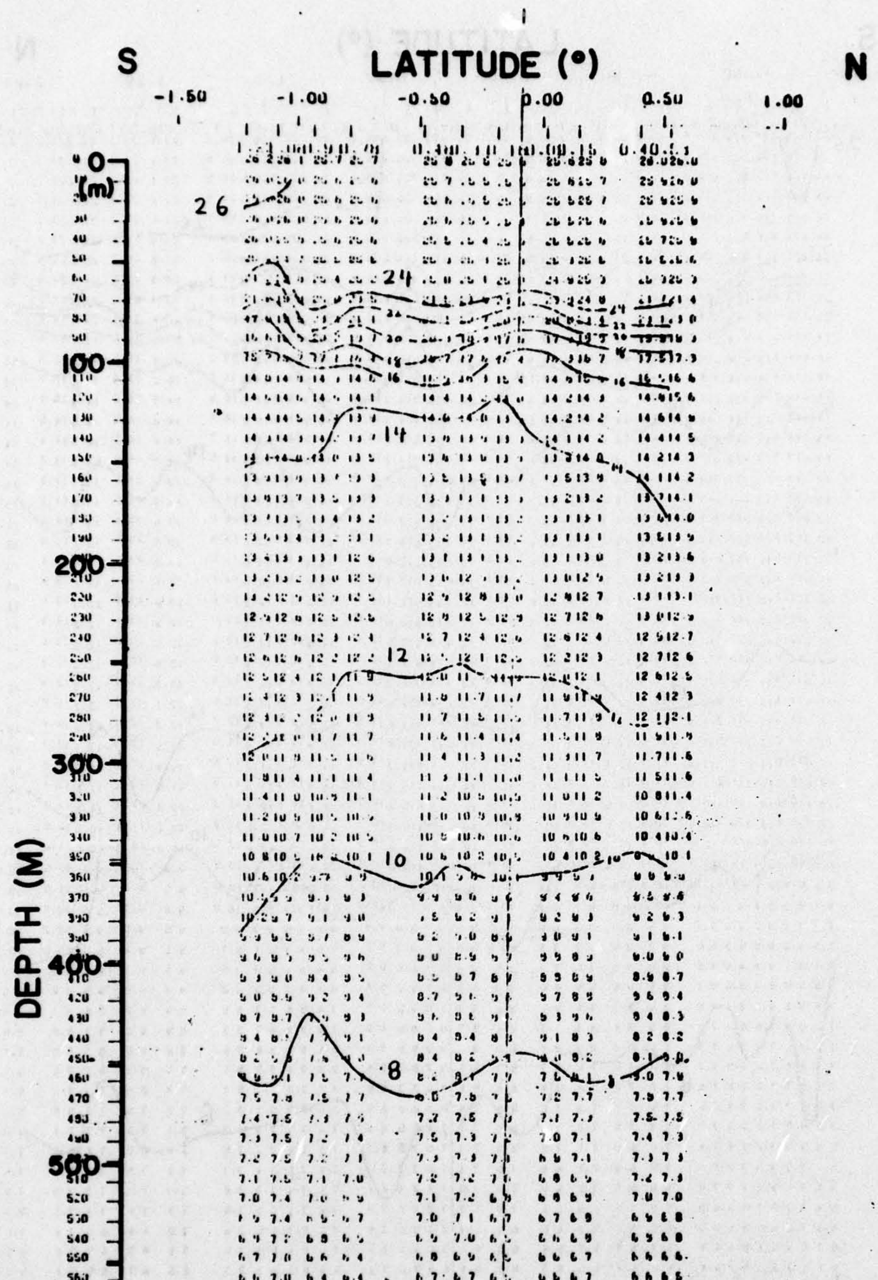


FIG. 78 TEMPERATURE (XBT) AT 28° W. LONG. 7-8 AUG.

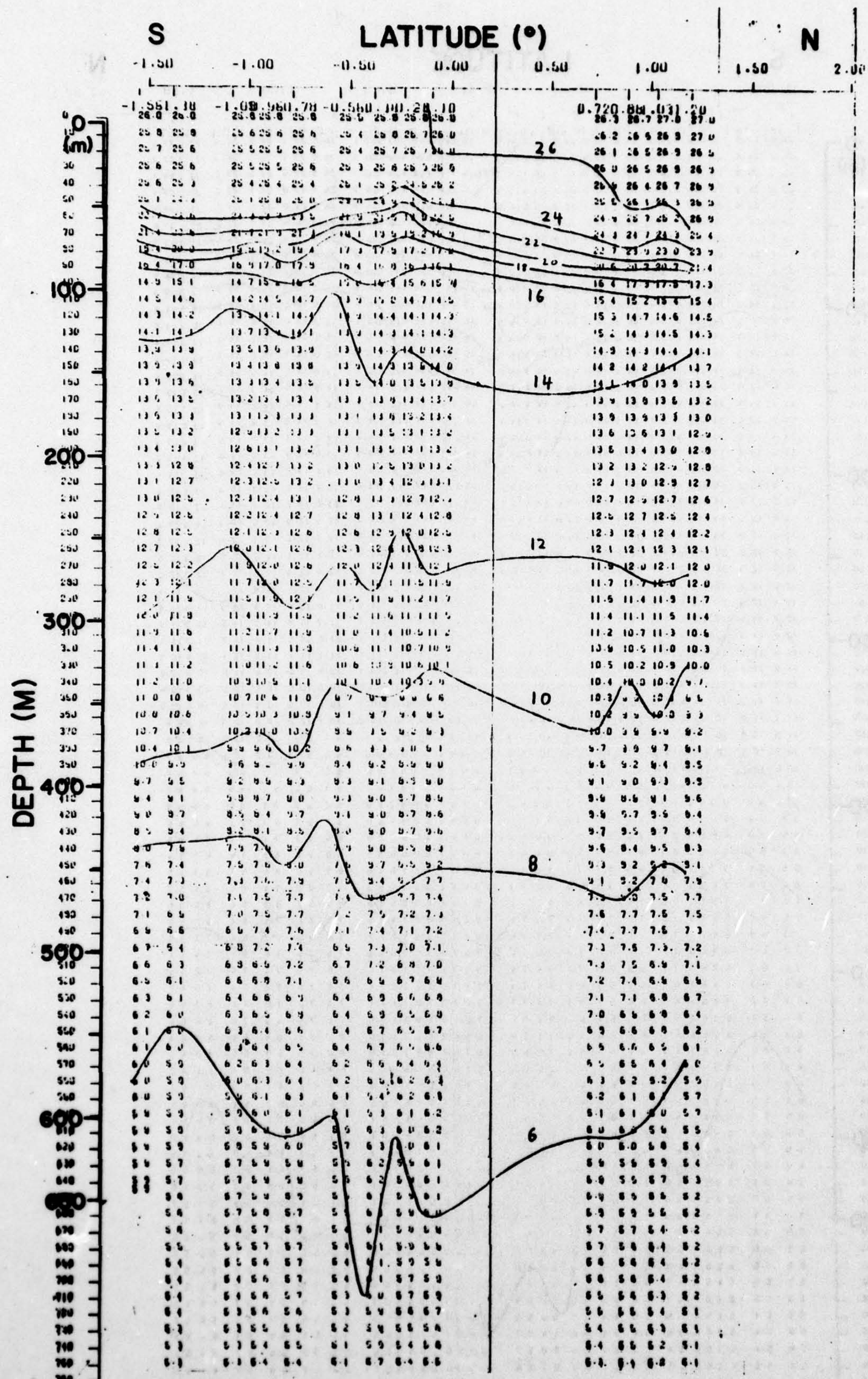


FIG. 79 TEMPERATURE (XBT) AT 28° W. LONG. 9–10 AUG.

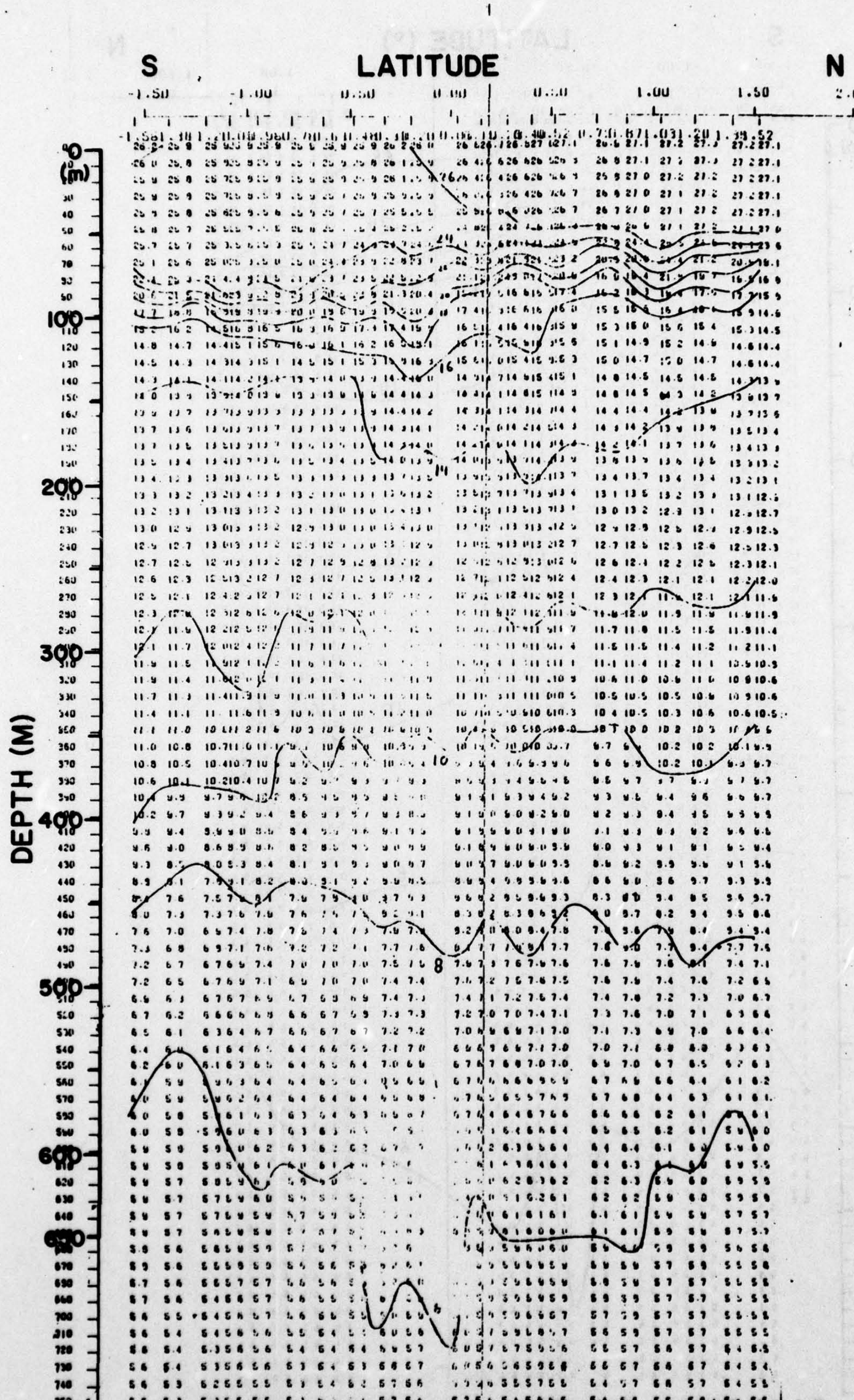


FIG. 80 TEMPERATURE (XBT) AT 28° W. LONG. 12-13 AUG.

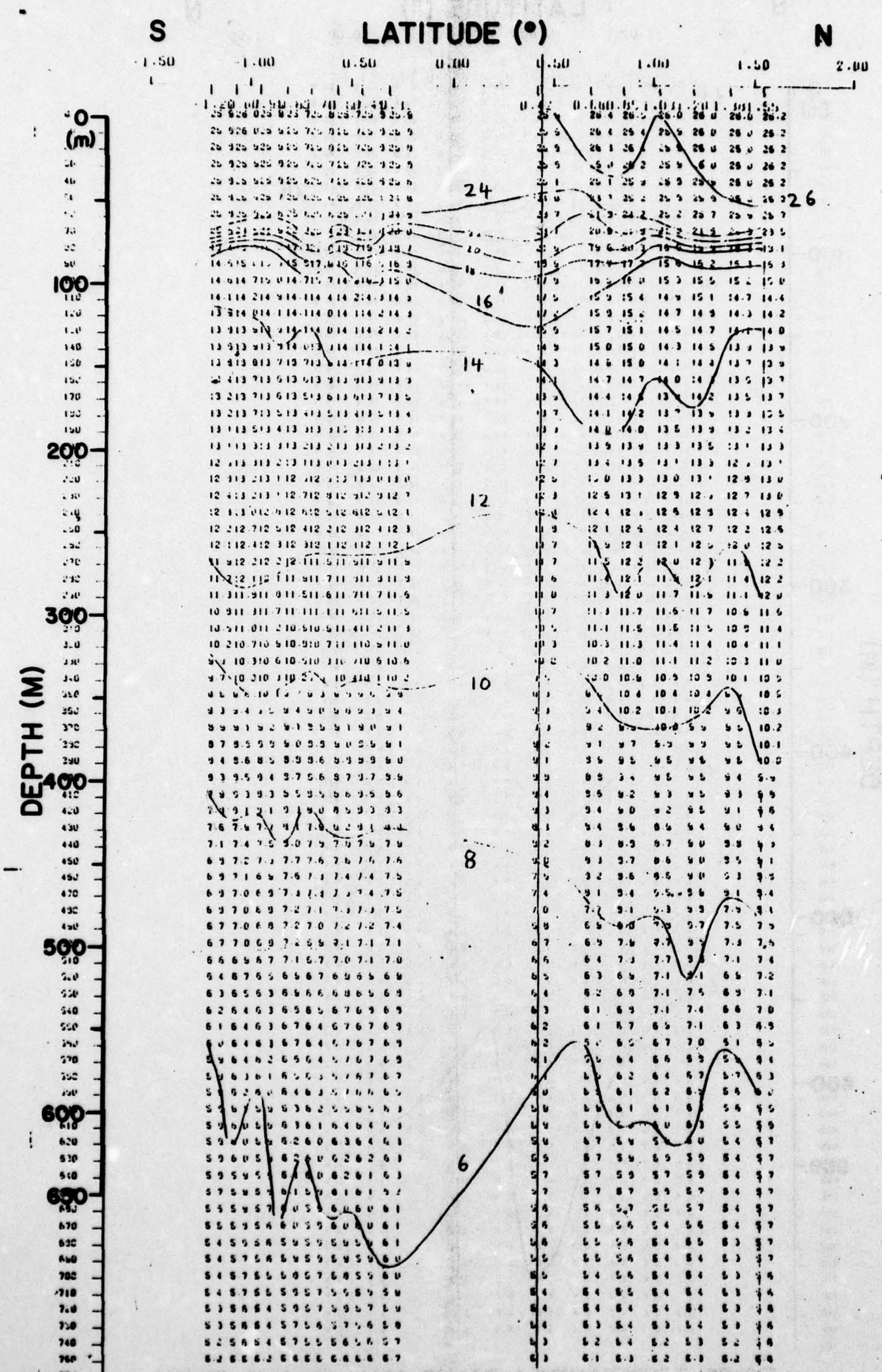


FIG. 81 TEMPERATURE (XBT) AT 28° W. LONG. 15-16 AUG.

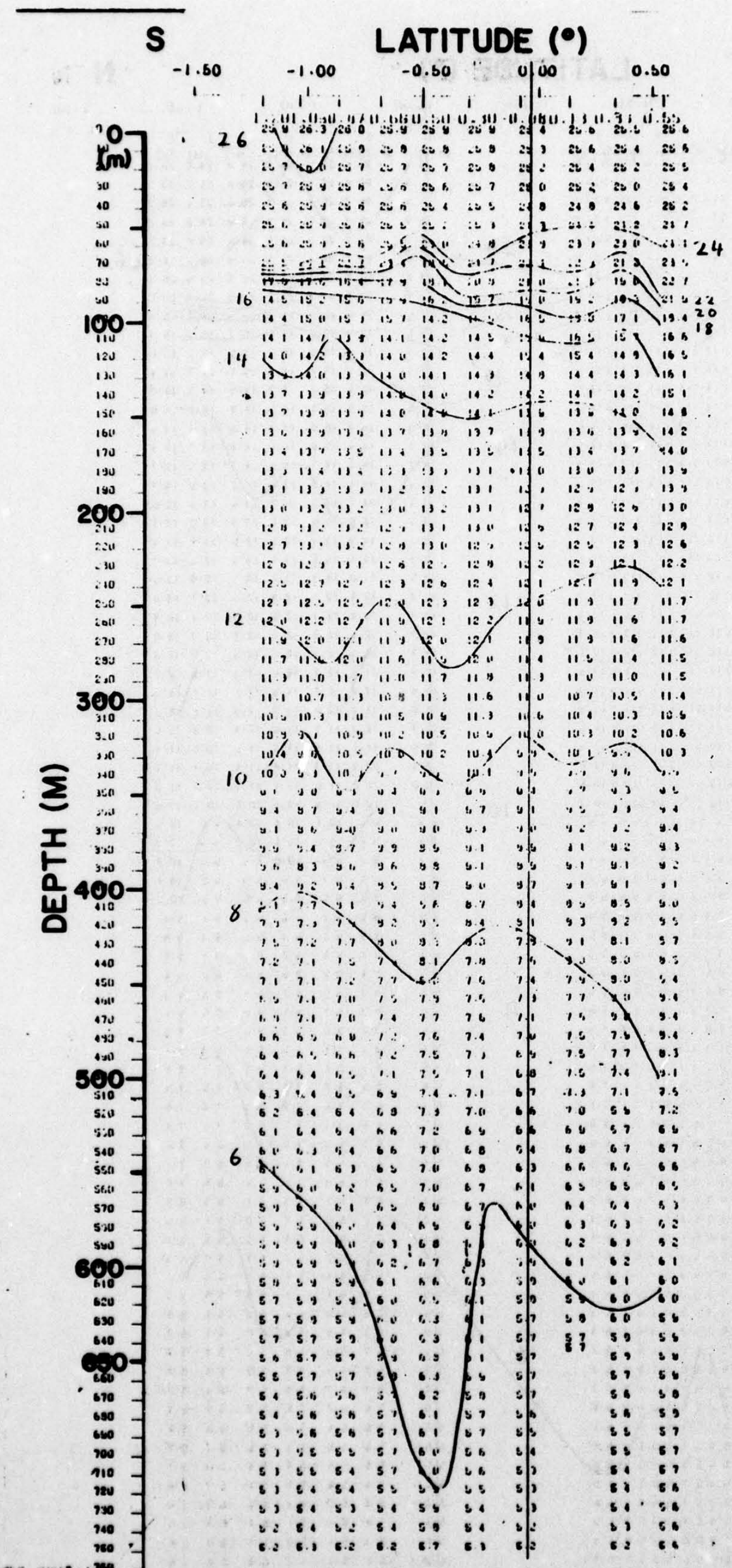


FIG. 82 TEMPERATURE (XBT) AT 28° W. LONG. 16-17 AUG.